YOUR COMPUTER

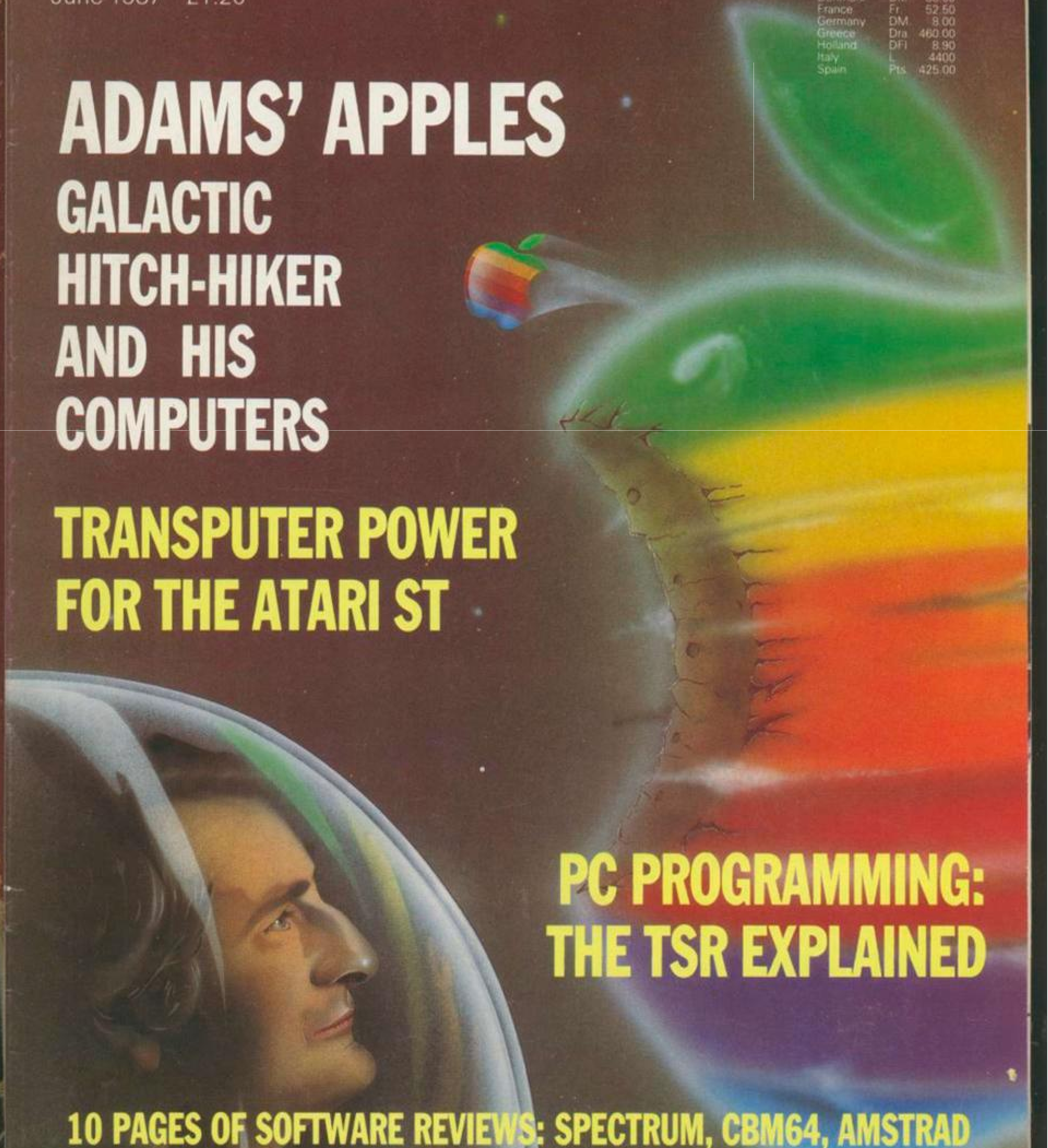
June 1987 £1.20

Denmark	DKr	36.00
France	Fr	52.50
Germany	DM	8.00
Greece	Dra	460.00
Holland	DFl	8.90
Italy	L	4400
Spain	Pts	425.00

ADAMS' APPLES

GALACTIC HITCH-HIKER AND HIS COMPUTERS

TRANSPUTER POWER FOR THE ATARI ST



PC PROGRAMMING: THE TSR EXPLAINED

10 PAGES OF SOFTWARE REVIEWS: SPECTRUM, CBM64, AMSTRAD


sinclair
MONSTER ME

GET YOUR HANDS ON THE NEW SINCLAIR 128K +2. BEFORE EVERYBODY ELSE DOES.



The new 128K ZX Spectrum +2 is more than just a monster memory.

It's the ultimate family computer.

With a built-in datacorder for easier loading, superb graphics capability, two joystick ports, a proper typewriter keyboard and more games available than you can shake a joystick at (well over 1000 software titles, in fact).

Better get your hands on the new 128K ZX Spectrum +2 soon.

Before they do.

£149

EMORY · MONSTER VALUE

Available from: Allders, Boots, Clydesdale, Comet, Connect, Co-op, Currys, Dixons, Electric Supreme, Laskys, John Lewis, John Menzies, Power City, Rumbelows, Ultimate, WH Smith, Wigfalls, and good independent stores.

We recommend Sinclair Quality Control Software.

To: Sinclair, P.O. Box 462, Brentwood, Essex C14 4ES.
Please send me more information about the Sinclair 128K ZX Spectrum +2.

Name ____________________

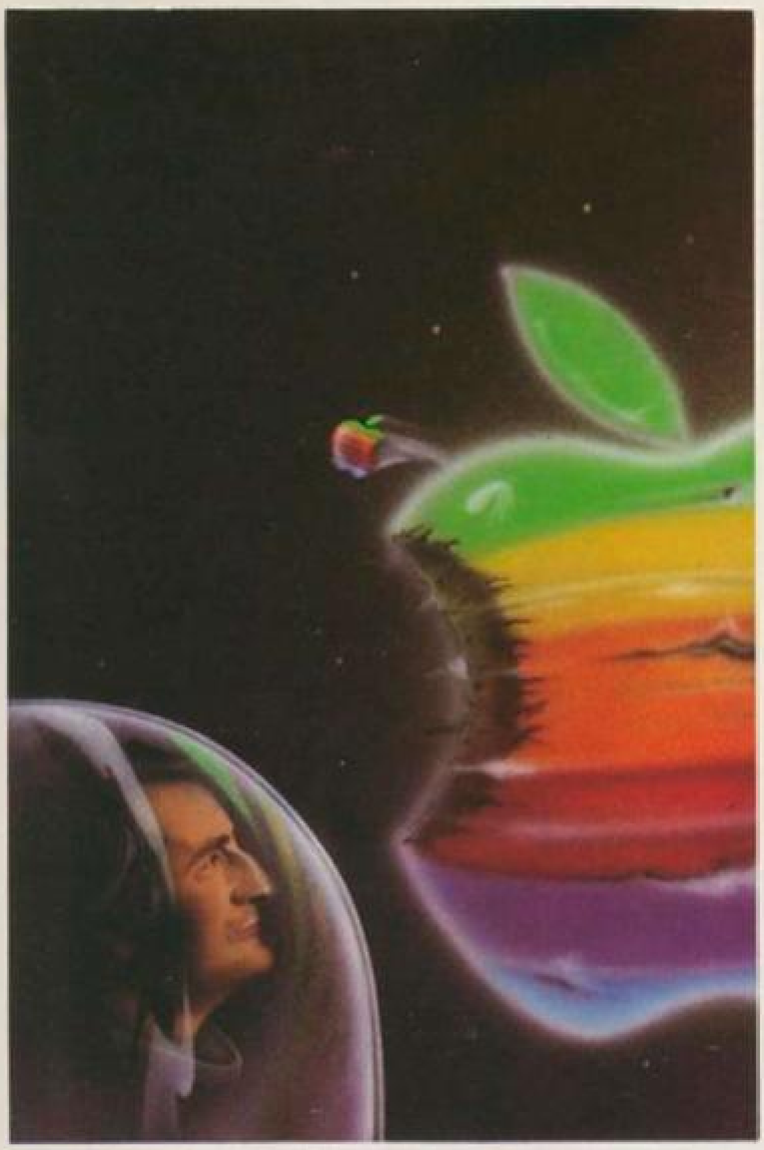
Address ____________________

sinclair

YC8

contents

JUNE 1987



COVER FEATURE

REVIEWS





Your Computer,
Greencoat House,
Francis Street,
LONDON SW1P 1DG
TELEPHONE: 01-834 1717
FAX: 01-828 0270
TELEX: 9419564 FOCUSG

ISSN 0263 088S

Printed by The Riverside Press, England.
Typeset by Time Graphics Ltd., Northampton.

Distributed by Quadrant Publishing Serviuces, Quadrant House, Surrey, SM2 5AS. Telephone 01-661 3239.

Subscriptions: U.K. £15 for 12 issues, Overseas (surface mail) £25 – airmail rates on request. Please make cheques/postal orders payable to Focus Magazines (allow 5 weeks from receipt of order to delivery of first subscription copy). Send orders to Your Computer Subscriptions, Oakfield House, Perrymount Road, Haywards Heath, RH16 3DH. Telephone (0444) 459188.

Back issues of the magazine from January 1986 onwards are available for £1.50 (U.K.), £3 (Overseas) from the Back Issues Department, Greencoat House, Francis Street, London SW1P 1DG.

REGULARS

FEATURES

NEXT MONTH

Space Max is an innovative space station construction simulator for PC owners. It faithfully reproduces the economic and technical pressures of running a space program, selecting a crew and managing all the resources at your disposal to get the NASA space station into orbit.



COMMENT

When will computers disappear? A popular debating point in the *Your Computer* office this month has been the Douglas Adams' suggestion that over the next few years computers will become as much a part of the furniture as refrigerators and electric motors.

The actual hardware is only interesting as long as it fails to live up to people's expectations – most computer users look forward to each new announcement with bated breath, hoping that each new machine will at last answer all their needs. Once personal computers reach a respectable state of development they will become inherently boring. The interesting element will be not the computer but the *computing* – the amplification of individuals' native abilities.

FOCUS MAGAZINES

Editor
Simon Craven
Staff Writer
Carol Atack
Sub Editor
Harold Mayes MBE
Production Editor
Nick Fry
Design
Chris Winch
Neil Tookey
Cover
Andrew Sullivan
Art Editor
Jim McClure
Group Advertisement Manager
Dory Mackay
Acting Advertising Manager
Tim Seymour
Classified
Paul Williams

Editorial Secretary
Sheila Baker
Managing Editor
Brendon Gore
Publisher
Paul Coster
Financial Director
Brendan McGrath
Managing Director
Richard Hease

Fantasy games evolve from sublime to ridiculous

The world of fantasy games is taking further steps into the ridiculous with every new release. Programmers no longer seem to be satisfied with the traditional scenario – you know, the one where the shining young hero marches around slaying trolls and collecting elvish treasures to take to the captive princess.

Barbarian, a recent release from Palace Software, takes the less obvious option of having more muscles on its hero and basing the princess on the well publicised charms of Page Three model Maria Whittaker. Palace claims that Barbarian is the most realistic combat game ever, so perverts among you can get excited now; your £9.99 also gets you a dark sorcerer to rescue Maria from and a hideously deformed dwarf, presumably to satisfy minority tastes.

Gore freaks are catered for by a decapitation scene and riveting music is promised from the maestro of *The Sacred Armour of Antiriad*. You don't get a wig like model Michael Vanwigk or a 53 inch chest but this is a fantasy game and you are allowed to pretend.



● **No prizes for guessing which is the programmer . . .**

Where Palace is content to write camp versions of reliable cliches, the latest offering from the Ladies of St. Brides School is an adventure based on the real life historical Jack the Ripper murders. For those of you who don't believe in the Ladies of St. Brides, they are an adventure writing team based in Ireland and run and establishment where people can relive their schooldays. Apart from providing welcome relief for sensation-starved journalists they also produce adventures like *Bugsy*, about a three foot high blue rabbit who becomes a gangster.

This is quite a departure for the ladies in terms of subject matter. Priscilla Langridge, who wrote the game, explained that they were reflecting the centenary of the murders recently as speculation about them has linked black magic and freemasonry to them and bizarre theories have sprung up as abundantly as bizarre adventure games seem to do.

"Nobody knows who committed the murders. It could have been a madman or a secret society practising ritual magic. This is all in the game so I'm not going to say any more, except that we've researched the case very thoroughly and it's all in there somewhere."

In the game you are cast as an innocent passer-by who stumbles across the first of the Ripper's victims and reports it to the police. That, you soon discover, was your first mistake as you are drawn into the ghoulish events and are forced to prove your innocence – this can only be done by finding the real culprits. Corrupt authorities and black magic conspire to make this far from easy.

Gory graphics are provided to enhance your enjoyment of the horrible happenings. Are these crimes suitable material for a fantasy game? Is the pleasure derived by players going to be slightly dubious in terms of taste? Ms Langridge defends the subject matter; "I don't think a computer game is any different to any other media. It is just as appropriate as any other form, just another way of telling a story."

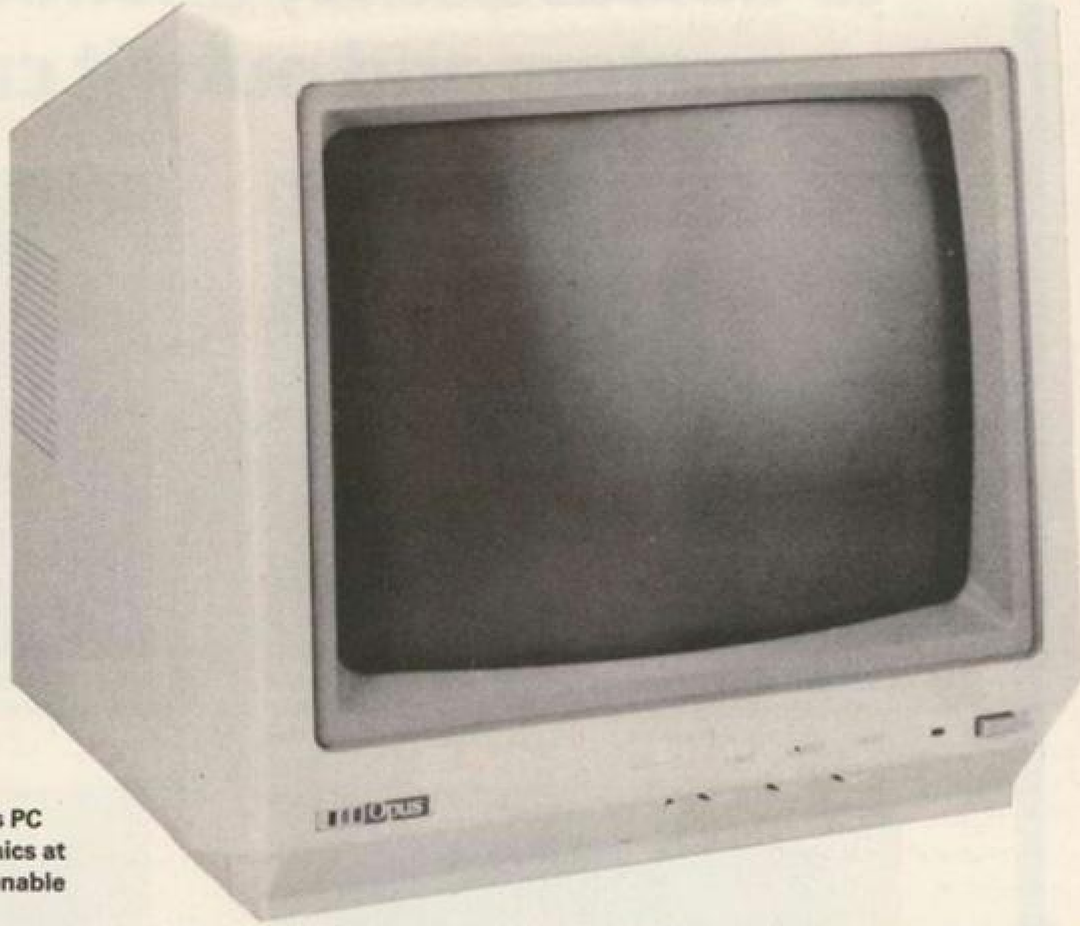
The game is serious in its intent and perhaps playing this terrifying adventure will give brave enthusiasts unexpected insights into police corruption and sadistic murderers. It is certainly a long way from magic lands and lost princesses.

Low cost EGA display

Enhanced graphics will become slightly more affordable with the launch of Opus' upgrade. For £399 plus VAT you get a super high resolution monitor and EGA card combination, suitable for the IBM PC/XT and compatibles.

The card is equipped with 256K of display memory, a light pen interface and a special screen save feature. Soft scrolling, panning and windowing are also possible. The monitor can handle 16 screen colours from a palette of 64 and offers 640 x 350 pixels resolution for enhanced g:aphics operation. The card emulates the IBM enhanced graphics and colour graphics adaptors, its monochrome display adaptor and the hercules monochrome graphics board.

In addition to offering the EGA upgrade Opus is incorporating the system into the PC II Turbo model which it also makes. This is accompanied by a £200 price cut across the range which leaves the introductory EGA model at £799 plus VAT, making it the cheapest machine of its type.



● **Hi-res PC graphics at reasonable cost.**

Budget disk development

At last the trend towards budget software has spread to the disk-based games market. Players, a company based at Aldermaston, has released a series of games at hitherto quite unthinkable prices – £4.95 for BBC, Atari and CBM 64/128 and £6.95 for Amstrad versions.

A feature of the series is the newly designed packaging. Disks are notoriously boring to look at and elaborate packaging is usually employed to disguise this fact.

Players is relying on a simple blister pack and extremely loud graphics to drag your eyes to its products; it hopes you will find it hard to ignore the rows of Zap-paks currently being crammed into your favourite shops.
shops.

Each Zap-pak contains two games. None of them seems particularly novel but for the price you will not be expecting anything other than retreads of classic concepts.

The covers helpfully include screen illustrations so if you can see exactly what you're getting, though with names like *Killapede* you can probably guess. Most of the other games in the first wave of releases employ the all too familiar jumping around the screen to collect things though with intriguing plots; in one game you are a bubble of water bursting to escape from a tank.

Twee as this may be it makes a change from shooting down the invading alien hordes and Players are probably to be respected for this. The first releases in this series hit the shops on April 15 and more are to follow in the near future.



● **Zap-paks . . . cheap disk games.**

The Atari 520 ST gives you the power to defeat deadly enemies, slaughter monsters and outwit cruel captors.



Gauntlet – U.S. Gold. Enter a world of monsters, mazes, mystery and combat in the ultimate role-playing fantasy game.



Tai Pan – Ocean. Voyage to 19th Century Hong Kong for action and excitement with pirates, smuggling and mutiny.



Metrocross – U.S. Gold.* It takes lightning reflexes to get past the potholes, obstacles and forbidden zones to reach the other side. And that's just the beginning!



Arkanoid – Imagine.* The latest smash-hit coin-op game! Are your reactions quick enough to handle 33 different play screens?



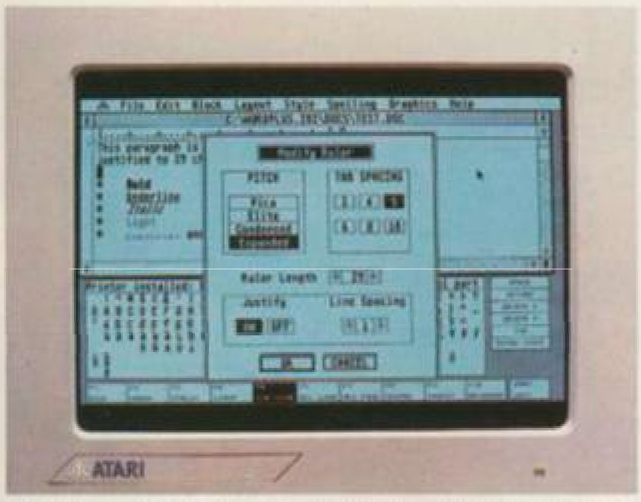
Star Raiders – Atari. Star Raiders are the only force strong enough to hold off the Zycroids. Your task is to command the Starcruiser – are you up to it?



Flight Simulator II – Sublogic. Take the controls of a Cessna 182 or Learjet 25G. With high speed 3D graphics for take-offs, landings and acrobatics, it's just like the real thing!

*Screenshots a

But it's not all fun and games.



1st Word Plus – G.S.T. Professional word processor featuring U.K. spellings and integration of graphics including 1st Mail for full control of form letters etc.



Superbase Personal – Precision Software. All the features of GEM combined with full relational database power. Easy to set up, flexible, plus unique picture index facility.



Fleet Street Publisher – Mirrorsoft. The complete desk-top publishing package. Gives you page make-up combining text and graphics for sophisticated, professional looking documents.



VIP GEM – Silica Distribution. VIP Professional is an integrated spreadsheet, database, and graphics package. GEM environment plus Lotus 1-2-3 compatibility.

Mixing business with pleasure is no problem with an Atari 520 ST. Not when you've got over 1,000 software titles to choose from.

You'll find all the latest games and a huge range of business titles from the top business software houses. And the range is growing all the time.

You won't be short of power, either. The Atari 520 ST is twice as powerful as most business micros.

So you'll be able to create spectacular colour graphics. Even animate them to make your own films.

If you're musically minded, you can compose and play a full symphony.

Or, for those who'd rather write programs than music, the 520 ST supports over thirty programming languages.

In fact, whatever you're looking for in a computer, you'll find it in the Atari 520 ST.



ATARI 520 ST
WORKS HARD · PLAYS HARD

…om the original Arcade game. If you require any further information concerning software featured please write to: PO Box 555, Atari House, Railway Terrace, Slough, Berks SL2 5BZ

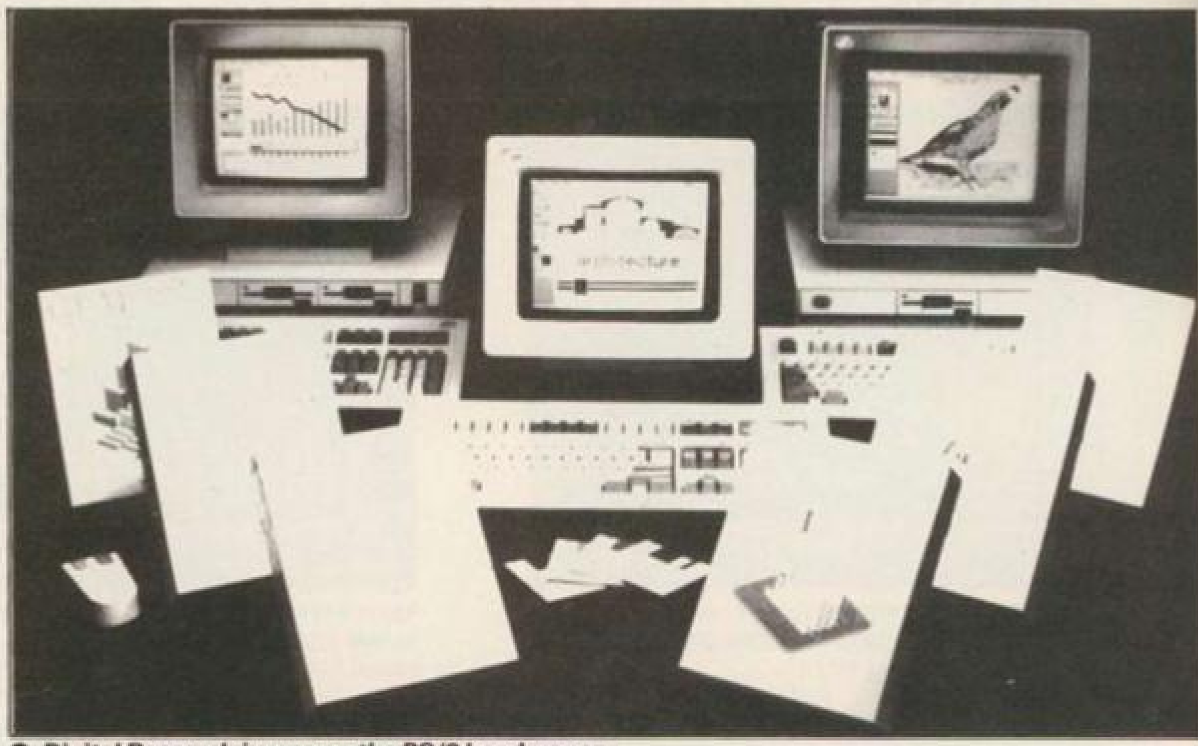
news

PS/2 hype

Following the recent IBM announcement of the Personal System/2 range, software manufacturers have been falling over themselves to announce versions of their product compatible with the new machines, and to endear themselves to IBM in fantastic adulation of the long-awaited new system. Only New System Persil can have received so much hype and excitement in the public relations industry.

First to arrive at the *Your Computer* offices was a missive from Micropro, makers of the mighty Wordstar. Wordstar 4.0 and Wordstar 2000 Plus 2.0 will be made available and eventually adapted to run under the new operating system. They will make use of features of the new system including MicroSoft Windows and multi-tasking. Of course with the new system the programs will run faster and better than on your mouldering old PC. Probably, anyway.

Digital Research will be making the entire family of GEM presentation graphics applications available from June in the new 3.5 inch format. They will be the same price as the current versions, and again the manufacturers claim to be delighted by the improved running of their programs on the new models.



● Digital Research jumps on the PS/2 bandwagon.

Gold freebie

Tandy customers who buy a new Tandy business or portable computer will be offered free registration with Telecom Gold. This usually costs £40 and will be particularly useful to owners of the 102/200 portables which come equipped with a modem and communications software suitable for use with Telecom Gold. Although this equipment is not standard to the business models the offer of membership of Telecom Gold can hardly reduce sales of the add-on components.

To qualify customers will be given an application form by their Tandy dealer, and Telecom Gold will allocate a mailbox number and password free on reciept of this. Purchasers of Tandy colour and pocket computers will not qualify for this offer.

Ripe Apple

Following the success of the new Macintosh and the revamped Apple II families of computers, Apple Computer Inc reports a 41 per cent increase in sales in the first quarter of 1987 compared to the same period last year. Although sales totalled $575.3 million net income was $33.9 million, a growth of only six per cent. This discrepancy is attributed to increased spending on an extensive research and development programme. These costs rose sharply over the last year as the company developed and launched new products.

Marketing costs were also high, almost trebling from the 1986 figure. Those self-sconsciously lustrous TV ads evidently cost Apple a lot of money.

MAN LOGIC

By NEIL BRADLEY



letters

Green green grass of JFK



I am writing to you about the review of *Flight Simulator II* for the Atari ST featured in your March issue.

I have bought this on your recommendation and enjoy it very much although I note that some airports, notably John F Kennedy, do not have tarmac runways and are virtually indistinguishable from their environs. I sent the disk back to the shop which replaced it with another with exactly the same problems.

Is this common to the program or am I getting a raw deal?

Michael Hall, Lochboisdale, Isle of South Uist.

Editor's reply: This feature is common to all versions of Flight Simulator II, not just the Atari ST variant. Big, complicated airfields are shown the same colour as the ground whereas some simpler runways, often those which one would assume to be grass strips, are shown in bold black. This apparent paradox has never been explained, though it may well be that the complex outlines of big airports can not be manipulated sufficiently quickly if they are shaded in fully.

Congratulations

This is an almost unique occasion as I am not given to writing to magazine editors, but I am compelled to let you know how pleased I am with the new format of *Your Computer*. Several years ago I started subscribing to the magazine which at that time consisted of many pages full of information, news, listings and material of general interest. Over the years it became more and more games oriented, with fewer and fewer pages and so much less interesting that I most certainly would not have renewed my subscription.

Now here let me say that as a pensioner, I own a computer purely for the pleasure I get out of programming routines and data handling programs, for my own satisfaction in solving the associated problems, and generally to marvel at the fascinating things which can be accomplished with a computer. I have not the slightest interest in games of the shoot-em-up or adventure variety.

I prefer games where the computer provides a worthy opponent in a game of non-fantasy basis, such as chess. So the articles I enjoy in your magazine are the news items on the latest hardware including peripherals, utility software, programming techniques, program listings and items on modems and inter-communication.

What I am trying to say is that I heartily approve of the new format and will be renewing my subscription when the time comes. Please, never fall back into being just a games review magazine; there are enough of those around already.

D. F. Gordon, Calver, Sheffield.

Protest

I read with interest the article in the April issue on *Protext*. I bought this word processor program on the strength of similar raving reviews of it and much regretted it. Your review reads like a list of unobtainable goodies. My copy has one major drawback: it does not print. Or, more accurately, it usually does not print. A print command is answered by either "unknown command" or when it does recognise "print" as a command it limits itself to asking for paper and moving to starting point.

Occasionally it goes as far as printing, though without form enabling. I have not been able to find out what triggers these different responses to the same command and frankly I am tired of trying: I have never seen a program like it.

I wrote to Arnor asking for help in this matter, but I have had no response whatsoever. *Locoscript* has a great advantage over *Protext* for me: it works, and works always.

Chantal Hamill, Livingston, West Lothian.

WACCI times

I am writing to tell you about WACCI, a rapidly growing Worldwide CPC user group based at 75, Greatfields Drive, Hillingdon, Uxbridge, Middlesex UB8 3QN. WACCI is in its eighth month now and we pride ourselves on producing the best amateur magazine on the market. It is A4 format and includes illustrations and advertisements every month, along with articles and columns on all the popular subjects, as well as a few on the less popular ones.

The club covers the length and breadth of the UK and has spread, so far to Spain, Germany, Norway and Australia. Benefits of membership include a 20 per cent discount on all full-priced CPC software, many hardware discounts and a free software library. There is also at least one competition each month – in fact, last month we had no less than 14 games up for grabs including *Starglider* and *Rasputin*.

Annual membership costs £12 (UK), £18 (Europe), and £24 (Overseas), half these amounts for a six month subscription. Mention *Your Computer* and you will receive a 10 per cent discount on your annual subscription.

Jeff Walker, Hillingdon, Middlesex.

Pinball rip off

Please pass on my congratulations to Mr D K Huff whose program *Pinball* you published in the March issue. By sheer coincidence he has managed to write a program exactly the same at a Mr Cromwell in the December 86 issue of *Amstrad Computer User*, although Mr Cromwell has put REM statements in his version. Hopefully you did not part with any money for this work of art.

R. G. Allan, PIU, BFPO 32.

Editor's reply: This is a perennial problem with program listings. The impossibility of keeping tabs on every listing printed in every magazine, together with some readers' unfortunate propensity for stealing the work of others and passing it off as their own, is one of the reasons why we now place less emphasis on readers' programs.

Something to say about personal computing? Why not share it with other readers? Write to Readers' Letters, Your Computer, Greencoat House, Francis Street, London SW1P 1DG. Letters may be edited for length. Don't forget to include your name, age and full address.

Byte back

On March 31 I purchased a copy of your magazine. I am not a regular reader and I only occasionally purchase a magazine other than my regular *Byte*, if there appears to be anything worthwhile. I purchased this copy because I noticed a competition for an Atari 520 STFM while browsing at the newsagents. I checked the front of the magazine and the issue was dated April 1987.

After I got home, having paid £1.20 I found that the closing date was the end of March. There is nothing in this magazine which I do not already know or is of any use whatsoever – the price seemed OK for a competition entry. I have therefore returned your magazine for a refund of my wasted money.

B. D. Johnson,
St Leonards on Sea,
Sussex.

Editor's reply: There's no escaping the fact that we made a blunder. The closing date was originally intended to be the end of April, not March. To give everyone a fair crack of the whip we re-ran the competition in last month's issue with an extended closing date – the last working day in May. Sorry for the inconvenience.

Rainbird to the rescue

I would like to devote this letter to a brief, but heartfelt thanks to everyone at Rainbird Software, who have graciously saved my bacon! Never let it be said that British Telecom are penny pinchers; I have proof that they are anything but.

In my work as a supply teach of music I usually take my faithful CPC 6128 into school with me, and use Rainbird's *The Music System* to show off the capabilities of machine and software to pupils and fellow teachers.

At one school where I taught recently some of the little darlings decided to have a go at re-writing my disks, including the TMS disk itself. The result was the TMS disk was damaged and most of my music files would be been lost if I hadn't had back-up copies at home.

As I only teach intermittently I was unable to replace the disk and was at a loss what to do, so I finally decided to put print head to paper and write to Rainbird, asking them to help me. The result was that I received a new copy of TMS by return of post and a voucher worth £3 towards any Rainbird game. I would like to thank Rainbird for their extreme kindness, not to mention their sheer speed in helping me out.

M. J. Lyons,
Burnage,
Manchester.

Amiga apology

I want to thank you for printing my letter in the March issue of *Your Computer*. I did think, however, when reading the letter over again that my wording of the letter was a little strong and I apologise for it. I do think you were correct in saying that there is a definite lack of coverage.

I think that all us Amiga users who enjoy our computers very much and read *Your Computer* every month would enjoy reading news about the Amiga and reading about the new software titles as they come out.

That's all for now and thanks again.

Nathan Singer,
Safed,
Israel.



● **Above: The Commodore Amiga inspires devotion from its users.**

Editor's reply: Thanks for the letter, Nathan – more Amiga coverage will be coming soon.

Disk trouble down under

I hope the drastic broom which swept your editorial staff to their present positions has left some links with the past and the stories and moves behind cold published facts. I wonder why Singapore drops off the cover after 1985, leaving New Zealand the sole readers' representative in the southern hemisphere.

The Hardware Hitlist article (*Your Computer*, May 1985) contains the best of the tenuous leads we have traced on the mysterious Triton Quick Disk Drive for 3in. floppy disks. That was a well-written review – alas, all too brief.

In the West Coast region of Wellington I represent a club of mainly Spectrum 48K users. Recently a small computer firm went out of business with a sale where we purchased a few Triton Quick Disk Drives, each with an interface and one floppy disk.

The firm knew nothing about Sinclair Computers but the box labels show that these Triton devices were probably from Hongkong and were intended for use with Spectrum computers. Experimentally, we found that the drives worked very well with some Spectrums but not with upgraded models.

Perhaps the promotion of the Microdrive in 1985 made it politic to go for that and to suppress the other but that is water under the bridge now. People are progressing from tape to Microdrive but there is a bigger hurdle to more substantial disk drive systems. We find these cheap floppy jobs a useful and educational interim stage, leading to more effective use of the Spectrum and better appreciation of the later generations of Z-80 descendants.

We do not seek to raise any awkward questions but we are desperate to find a source for the 3in. floppy disks and for a Triton centre or agency. Could anyone direct us to them?

We have been faithful followers of *Your Computer* for some years and hope to continue to find guidance from it.

Denis McMahon,
14 Gear Terrace,
Porirua,
New Zealand.

Editor's reply: Anyone who can help Mr McMahon and his friends in New Zealand, please write to him and help him find his floppies.

Disgruntled of Chertsey

I have taken computer magazines regularly for the last few years and find that whenever I stop taking a particular magazine, it ceases publication in a short period.

I have a complete set of *Your Computer* magazines from Vol 1, No 1 to date. You may be interested to know that in view of its poor content I have now stopped taking this magazine.

D. O. J. Hiscock,
Chertsey,
Surrey.

line noise

Communications ne

There are many ways of crossing the Channel. You can get seasick on a ferry or spend half your life in what are ironically known as departure lounges at airports. For others there is the option of sitting in some Kentish field waiting for someone to dig a tunnel.

Alternatively you could stay at home and leave the hard work to your computer, your modem and your bank account. The point is that it is possible to enjoy the atmosphere of life on the European continent by accessing Teletel, the French equivalent of Prestel, once you have the proper software.

What is more, doing it will soon have you thinking about the type of service the French are being offered, compared to what the British companies are providing.

To start, it is worth looking at typical Teletel and Prestel users. Prestel was having a bad time trying to get off the ground before the likes of Viewfax and Micronet arrived. The vast majority of Prestel users are travel trade and computer users.

Teletel, on the other hand, has a far wider range of users, and for one very good reason – most Teletel users were given their equipment. It all started about five years ago when the French state telephone company decided to put its directories on-line, where they would be easier and cheaper to update. The company then gave a large number of its subscribers terminal sets known as Minitels, worth about £300 each, rather than printing-out paper copies of the directories. There are a reported 2.5 million Minitel users now.

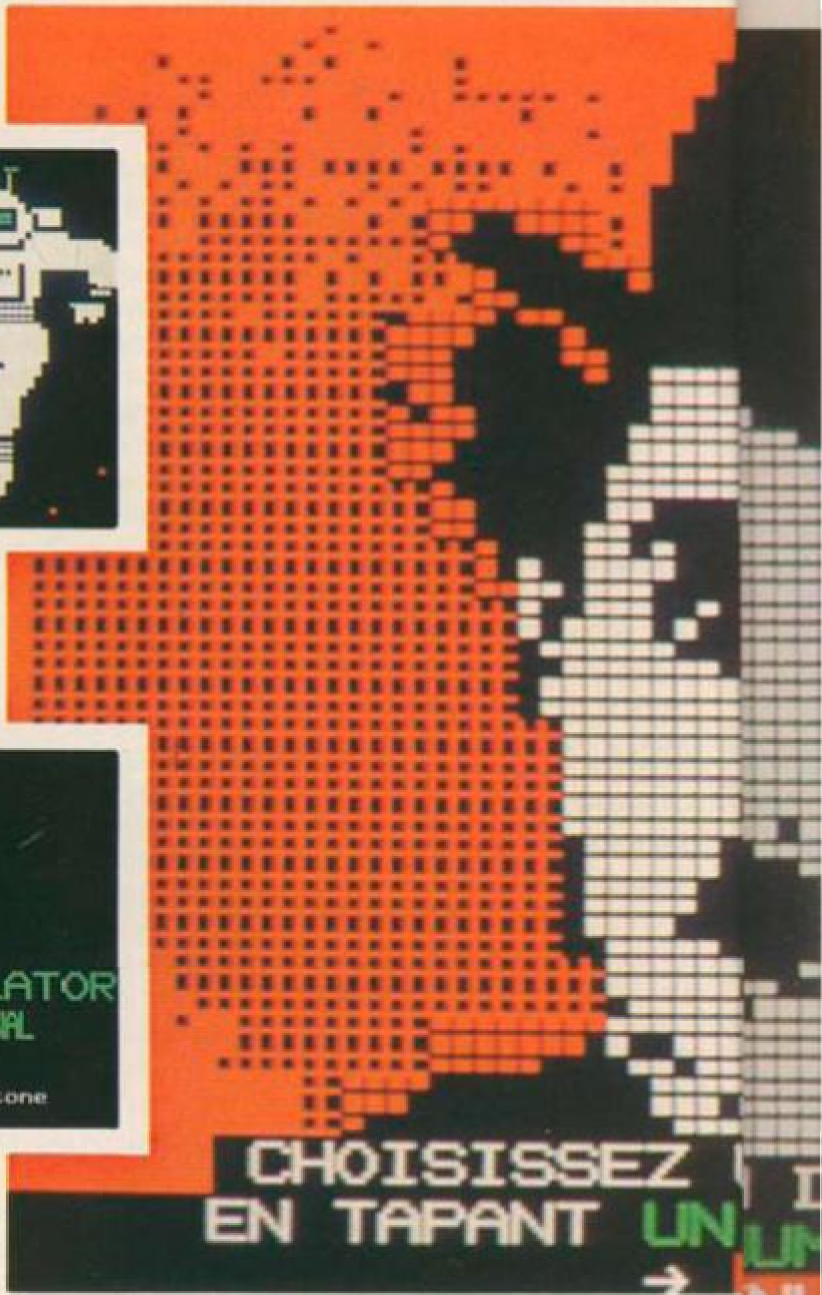
As well as saving the cost of printing and distributing thick wedges of paper, the company also gains revenue from the on-line system by selling advertising space and charging customers to use it.



● **Above: Teletel offers a guided tour to new users.**



● **Above: the emulation software from Aldoda is largely self-explanatory.**



At least Minitel owners have to use their telephones to find a number. The system grew from there. It expanded, with hundreds of information providers setting-up their own databases. Now directory enquiries account for only about one-third of all Teletel accesses.

Like Prestel, most of the system is free, which is why you can access it from the U.K. without first having to open a French telephone account. Unlike Prestel, the system is not run from a central base. The general videotext system, known as Teletel, consists of hundreds of independent systems – about 1,200 at the last count – all conforming to the Teletel standard and linked to form a vast network. Some of them are available by direct dialling but most are accessed through three main exchanges, or Videotex Access Points.

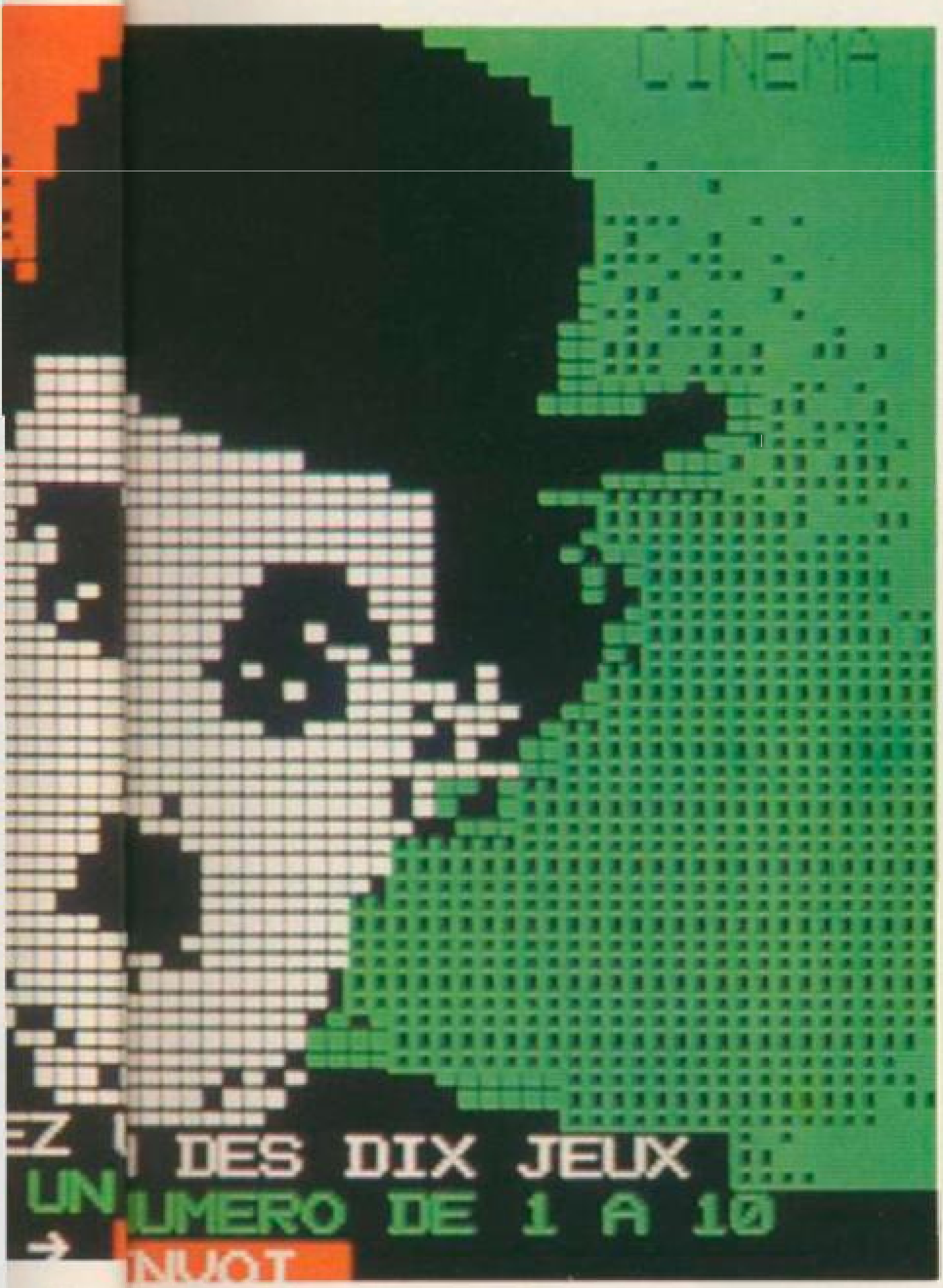
The hosts range from micro-based, home-grown systems to large commercial operations. Some demand that you take a subscription but that can often be done on-line with a credit card number.

The information supplied is also varied, from train time-tables to assistance with personal problems.

All the hosts are available from the three main VAPs, known imaginatively as Teletel 1, 2 and 3. The last, known as The Kiosk, has the most popular areas. Charging varies according to which VAP you use. With Teletel 1, for example, some of the data connection charges are billed to the hosts, which is why many of them require a subscription.

A recent article in *The Observer* colour supplement highlighted some of the more salacious activities on Teletel. The system has a chat mode where you can converse directly with one or more users. The facility is even

news from Jill Phillips



T E L

being used for the kind of dialogue more usually found in blue movies.

You are never sure to whom you will be talking. Many people live their fantasies through their computers. It is a little like playing *Leather Goddesses of Phobos* with real people.

It is the oldest game in the electronic book. That kind of thing happens with any system offering chat facilities. I know of one Telecom Gold user who made his dates that way.

There is one other major difference between Prestel and Teletel. Prestel, and most other viewdata systems, are based on a page numbering system. In the early days many Prestel sets had single numeric keypads. The system was designed so that it could be used from a push-button telephone.

Only recently, and in half-hearted fashion, has Prestel allowed you to move around by typing-in words. Teletel, on the other hand, started with sets equipped with full alphanumeric keyboards and so, in addition to the customary menus, keywords are used extensively – there are no page numbers.

The catch with this is that you cannot log-on with your usual viewdata software. The system uses different codes and protocols, so you need special software. Aldoda International produces a software package called 'T' for the BBC micro and is working on versions for IBM PC-compatibles and the Apple Macintosh.

The simplest way to get on to Teletel is to telephone France. But if the thought of making international calls makes your hair stand on end, the answer is to get yourself a PSS account.

For those who do not know what PSS is, it is a way of making long-distance data calls cheap. The idea is that BT takes all the data emanating from various people, squeezes it into packets and then puts together the packets, so there is very little idle time on the system.

You have to pay a £25 joining fee, plus quarterly subscription and usage charges. For the vast majority of people the telephone call you make is charged at local rates, no matter where in the world your data is going. For international calls, and even some trunk calls inland, you save money eventually.

The PSS system connects to the French equivalent, Transpac, which is also used for linking the hundreds of hosts on the Teletel network, although that part of the operation is invisible to the user.

Once you are on, you will face the next problem – it is all in French. That is not wholly unreasonable but there is some good news. First, it will help you improve your command of the language; and, second, there is an increasing number of English-language sections scattered about the network.

The English content could increase, too. When Aldoda introduced Teletel software in the U.K. the company mentioned a scheme to open a London-based node for the system, probably using PSS for the link with France. A London node is already up and running. The problem is the French. They have not determined how to organise billing but once that is sorted out the U.K. node should swing into action.

By this time you could be forgiven for wondering whether it is worth the trouble. If your French is good – and with the cost of international calls you do not want to read too slowly – Teletel has much to offer.

There is little benefit for the casual user but for anyone interested in comms it is a worthwhile experience. The range of the systems on offer will make the average Prestel user weep. It is the diversification of the system which makes it interesting. It has been made easy for people who have no real interest in computers to take part in the world of information technology in a painless and entertaining way. If only that could happen in the U.K.

2

Software for Teletel
Teletel software for the BBC B and Master micros is available at £27.50 from:
Aldoda International, 201 Haverstock Hill, London NW3 4QG. Tel: 01-794 0991.
Telecom Gold: 72:DTB10179.
Prestel: 017944999.

Accessing Teletel
You can dial direct on the following numbers using 1,200/75 baud:
Teletel 1: 010 33 36 13 91 55
Teletel 2: 010 33 36 14 91 66
Teletel 3: 010 33 36 15 91 77

The main services available via PSS on 1,200/75 baud at the moment are the telephone directory on A9208035000613 and Infotel which has a chatline and on-line romance service. It is on A9208076001663.

line noise

Hackers appeal

Steve Gold and Robert Schifreen, who were both prosecuted successfully in April last year for hacking Prestel, are to have their appeal against the convictions heard on June 29. They were arrested in March, 1985, soon after the national press went into top gear regarding the hacking of the Duke of Edinburgh's Prestel mailbox and other embarrassing security breaches at Prestel.

They were eventually fined £1,250. It is understood that the appeal relates to the action of BT in attaching data taps to the telephones of both defendants without a warrant, as would have been required if the tap was for monitoring voice conversations. The appeal is expected to last up to three days.

Translation

The European Centre for Automatic Translation has announced a new on-line language translation service, Cotel. Accessible via PSS, text in English, German, Italian or French can be entered via a standard comms terminal and in a short time the text will be translated into any of the selected languages.

On-line translation services are not entirely new but what makes Cotel special is that the service is automated and translations are usually completed in just a few minutes. The computerised translation system, Systran, has a 100,000-word dictionary and a special technical vocabulary.

ECAT admits that the translations produced by Systran are not so good as human versions but speed and convenience outweigh the disadvantages. Price is also competitive, from between 10 and 30 pence per word according to text size. More details on Cotel can be obtained from the company's Luxembourg base: Tel: 010352 438 388.

Speed approval

The new director of the BT telecoms approvals board, David Clarke, has re-affirmed the need to speed equipment approvals at BABT. Clarke is committed to recruiting more engineers to carry-out technical testing and unspecified improvements to testing procedures are also mooted. There is no indication that test standards will be reduced to ease the flow of test applications.

Gold fax

BT Gold has begun experimenting with a fax-style messaging system whereby subscribers submit typed pages to a special BT Gold fax bureau top be digitised and then sent as normal electronic mail.

Unlike true fax, where the whole document is scanned at one end and reproduced at its destination, the Gold system can understand only typed script, though within that limitation Gold is claiming good flexibility and both Roman and Arabic characters are legal.

Obviously the system cannot cope with custom fonts, drawings, diagrams or letterheads. Unrecognised characters are marked by a padding character. BT Gold claims one of the advantages of the system is that it should be more accurate than a manually-transcribed service.

So far the service is available only to limited number of Gold users. The system effectively is undergoing trials, though for the record Gold fax items cost £2 per 1,000 characters, with a minimum charge of £4.

Viewfax closes after six years

Long-standing Birmingham-based Prestel Information Provider Viewfax has closed. The popular area aimed at microcomputer users on Prestel had been on-line for six years and was one of the forerunners of Micronet.

Although Viewfax had a big-time image on-line, it was run as a small private venture by Lindsay Reid, often with a staff of only two or three but with the generous help of a customised BBC Econet network and several legendary Technalogics viewdata computers.

Reid, who admits that Viewfax was really more of an expensive hobby, will now devote more time to his more lucrative ventures, a bustling wine bar and restaurant and a computerised sound system.

Micronet is negotiating to keep certain independent Viewfax areas operating.

Dacom Quad

Dacom have unveiled a £599 plus VAT state-of-the-art PC card modem, the Quad. The device runs all the popular data speeds from V21 – 300 baud – up to V22bis – 2,400 baud. An important feature of the Quad is that it has its own V24 port, permitting RS232 connection to a local data network when the modem is not being used on-line externally. Therefore you can either save on an extra RS232 comms card or avoid the need to unplug your printer every time you need to access your local network.

BTI launch Text Direct

The newly-set-up BT division, British Telecom International, has unveiled a new Telex service for electrical mail users. Most commonly-used electronic messaging systems interface to the national and international Telex network, usually by utilising one central Telex centre forwarding Telex messages between the e-mail system subscribers and the outside world.

Prestel and BT Gold have offered the system for some time, though its disadvantages are that a special answer-back code, usually your e-mail mailbox number, must be placed strategically on the document being transmitted for it to be forwarded successfully to a subscriber's mailbox.

The BTI TextDirect service still requires an answer-back code but BTI claims that its new system is now much simpler, requiring only a nine-digit Telex number. Although TextDirect costs a £20 joining fee plus £25 per quarter standing charge, regular use of the facility provides competitive value – 10 pence per minute connect time and a very reasonable one penny per 100 characters for inter TextDirect customer messaging.

External messages cost 3.5 pence per minute while they are being sent, or about 3.5 pence per 400 characters, in the London catchment area. That rises to about 10.5 pence per 400 characters outside London. TextDirect long distance rates are very competitive compared to the BT Gold flat rate of 5.5 pence per 100 characters.

The Telex war looks as if it will hot up with the MercuryLink 7500 entering the fray shortly. More details on Freefone TextDirect.

books

Mastering the Atari ST

Author: John M Hughes
Publisher: Sigma Press

This is another of those books which pictures you as the new owner standing there with your brand new computer in front of you and, the authors hope, their book in your hand. Your ignorance is catered for: "You don't need the natural caution with which most people approach computers for the first time" states the introduction, and the sensible ordering of topics leads you through setting up to making real use of the machine. In the opening pages you are wondering where on earth all those wires can possibly go and 200 pages and twelve informative chapters later you are zipping around spreadsheets as if it was a basic human activity.



This book aims to provide a guide to the small business, home and educational uses of the ST which comes down to lots about word processing and an introduction to databases and spreadsheets. Before this however there is an introduction to using the machine and the GEM system. This includes the manipulation of windows and how to move and size them. Everything you need to master the GEM environment is outlined and each point is labelled clearly enough for easy reference.

Two more chapters cover organisation of disks, start-of-day disks and exploring ways of working. The emphasis is on speed and efficiency. Naming and renaming files, putting them in folders is covered again with the intention of getting the most efficient performance out of the system.

After a quick run through operating systems, accessories and more general hints on running programs there is a look at the vital element of choosing a printer. The obvious differences between daisy-wheel and dot-matrix printers are pointed out. This is all a prelude to the main strength of this book which is the four chapter guide to *1stWord*.

By this point Hughes has introduced quite complex operations and all aspects of word-processing, printing, composing and editing text with 1st Word are covered in enough detail and depth to make this a very useful guide. The book is well organised with detailed chapter headings and a comprehensive index so whatever your difficulty help should be close at hand. Finally there is a less detailed look at databases and spreadsheets, based on *Laserbase* and *VIP Professional*. Good design and a chatty but informative style make the book a pleasure to use and Atari owners whether experienced or bewildered should be able to benefit from it.

Carol Atack

Electronic circuits for the computer control of robots

Author: R A Penfold
Publisher: Bernard Babani
£2.95

"Robots and robotics offer one of the most interesting area for the electronics hobbyist to experiment in" says the blurb on this little book, a companion to the book about controlling train sets we reviewed last month. A recurring fantasy for most of those with an interest in computing and circuitry is to build a robot, if not to the specifications of sci-fi or Fiat at least to the extent that it will scuttle round the floor to your satisfaction and amusement.

This booklet may not show you how to create the rather disturbing tin man on the cover but it does provide a wealth of diagrams to overcome the sticking point the author has identified in amateur robot builders' attempts. This is the interface of the computer and the motors, and the feedback from robot to computer. The circuit diagrams included in the booklet are all designed to address this problem and get the computer and the robot talking to each other.

It is assumed that you have already acquired a robot, perhaps by means of a kit, and the opening chapter tells you what sort of motor should drive the beast. Your computer will need to be equipped with a user port or parallel port, and a standard RS232C or RS423 will suffice.

The information given is all very clear and the diagrams simply drawn. The lack of an index could be a problem if you are faced with a reluctant robot and need specific advice to get it moving. Building a circuit and controlling a robot could, as the author says, prove extremely interesting and add a new dimension to your computing activities.

Carol Atack

Mastering View, ViewSheet and ViewStore

Author: Clive Williamson
Publisher: Sigma Press
£12.95

Thius is another of the *Mastering* series of guides and covers the View range of software for Acorn computers. It is intended to be of use to both newcomers to the programs and those who want to improve their usage and get more out of View. It is based on version 3, and the total advice offered to those possessing earlier copies is to upgrade; in the author's opinion the superiorities of version 3 are such that no lesser action will suffice.

The book is sensibly laid out with a setting-up section preceding a detailed run through the three areas in which View operates. Installing program and printers on both the Electron and the BBC Micro is covered, including changing screen colours. A printer menu program for Epson models is given, as is more shopping advice, urging you to acquire a disk drive should you still be struggling on with cas-



settes. Here is a suggestion for a very useful guide – mastering your computer without lavishing every last penny on it.

Buying a guide to a program to be told that your version is yesterday's thing and all you can do is buy a new one isn't much good when what you want is to get the most out of what you've already bought. With new versions of programs succeeding each other more and more rapidly not every-one is going to rush out and upgrade every time they're expected to by greedy publishers and opportunist guidebook writers who get these things free.

Back to *Mastering View, ViewSheet and ViewStore*. The word processing section begins with a guide to all the commands for moving text, deleting and altering the format. The next chapter covers page layout, commands for altering said layout, line spacing and headers and footers. Printing and problems come next, with the most space devoted to running out of memory. Two solutions, using separate files and continuous processing are offered. As an afterthought a software patch to improve the operation of View 2.1, which the author claims is dogged by compatibility problems, is included, as are techniques for speeding up the operation of version 3 and search and replace commands.

The section on ViewSheet includes simpler explanations of the purpose of spreadsheets and using ViewSheet, with useful examples such as calculating gas bills. Other examples given to explain the role of the spreadsheet as a database, if that isn't too confusing, include home insurance listings. The chapter on advanced use includes windows and setting their parameters, expanding the spreadsheet and what to do if small problems such as a rogue % sign appear on the screen.

Viewstore is introduced by a consideration of what is a relevant use for a database in a home environment. The examples given involve personnel records and library catalogues, and the section concentrates on office uses. No mention is made of the Data Protection Act; so perhaps you should stick to the library applications.

Finally a section explains how to integrate the three sections of View which is especially useful if you want to perform calculations on information held in a database. If you've any cash left, Viewplot, a graphics add-on, and Overview, an integrated version with ViewSpell and extra help sections, are temptingly described.

Carol Atack



Success in Software

Author: Richard Hanson
Publisher: Superior Software Ltd

If you are a whizz-kid programmer anxious to get your games on the market you would be very silly to ignore this book. It goes through every step of the procedure for turning your programming skills into hard cash via a top selling computer game. The market for games software is increasingly sophisticated and this book will provide you with the inside knowledge to create a game you can sell.

Additionally it describes the pitfalls which await the unwary, such as rip-off payments. You are advised to settle for a fixed royalty rate rather than anything as nebulous as a percentage of profits or a one-off payment. This is quite sound though it has to be added that whatever your agreement you should ensure that it is made with a thoroughly reputable company or that you have independent advice. *Success in Software* covers legal aspects like signing contracts and points out the agreements you should be wary of. Of course if you are under 18, as the enticing examples of high achievers in the book are, you shouldn't sign anything unless you want to commit yourself to months of legal action in the future.

It may be irresponsible of books like this to suggest that there is a fortune to be made in the games software market. Competition is such that all margins including author royalties have been cut. That doesn't mean that you should sign for less than your work is worth, simply that you may have inflated ideas about the worth of games programs in the first place. You are wisely advised by this book to seek professional advice at every juncture and a good accountant is a necessity once your program is out and selling.

In addition to financial and legal advice *Success in Software* provides useful advice on how to bring your work to the attention of software houses in the first place. The first chapter shows the dedication to programming that is needed; about thirty hours is reckoned to be the minimum. The book provides a list of guides to individual machines to help you overcome programming problems, though if you're working with a software house their experts, the book suggests, will be there to help you iron out the difficulties.

Although this book includes ideas to boost your creativity (basically, read de Bono on lateral thinking) it is down to you to come up with the original concepts from which games are created and clones of existing games are unlikely to bring you fame or wealth. Unfortunately imagination and creativity cannot be side-stepped or ignored and whatever advice how-to books like this can offer without these characteristics your programming time will be wasted.

Carol Atack

SPELL-MASTER ROM

This is the first completely ROM based spelling checker in the world. As a result it out-performs all known spelling checkers on this machine or any other micro-computer. The single 128K EPROM contains over 59,000 separate words and 22K of program.

Compatible with all BBC Micros

Special switching techniques ensure that the 128K ROM appears to the machine as one single 16K ROM - this guarantees that it is completely compatible with the ROM sockets in all versions of the BBC Micro- computer.

Compatible with all the major word processors

SPELL-MASTER has been designed to fully integrate with the most popular word processors on the BBC, WORDWISE and WORDWISE PLUS, VIEW and of course INTER-WORD. While editing in these word processors all that is necessary to control SPELL-MASTER is to press one CTRL key (Usually CTRL-J). This causes a menu to appear listing a variety of options such as 'Check entire text', 'Check word at cursor', 'Continuous check - on/off' etc. Text is checked directly in memory while in the word processor. There are even short-cuts to the menu, for example, pressing CTRL-V in any of the above word processors will start checking the text immediately from the current cursor position. Compare this with the process of checking text in the most highly rated competitive product - VIEWSPELL.

VIEWSPELL	SPELL-MASTER
•Save text from word processor. •Enter spelling checker. •Load text into spelling checker. •Check the text. •Go back to word processor. •Load marked text. •...finally, make corrections.	•Press CTRL-V • make corrections.

Check entire text

In a word processor, SPELL-MASTER can check at up to 10,000 words per minute. Whenever a word is indicated as misspelt the user is given three simple choices. Replace the word with another selected from the dictionary, ignore the word altogether or add it to a user dictionary.

Check as you type

Because the dictionary is ROM based it is possible to check words as they are typed. This feature works with all the above named word processors and does not slow the operation of the word processor at all. Whenever an incorrect word is entered the computer will bleep; the word may then be corrected or simply ignored.

User Dictionaries

SPELL-MASTER supports extensions to the main dictionary in sideways RAM or ROM. This has the advantage that there is no speed degradation when checking against user dictionaries, since there are no disc accesses required at all. Once a word is added to a user dictionary it is treated as if it is present in the main dictionary.

SPELL-MASTER can support a number of separate dictionaries at once, each sideways RAM or ROM holding up to 3000 additional words. Once a dictionary has been created it can be 'burned' into an EPROM to form a permanent extension to the main dictionary.

Provision is made for editing any dictionary extension, for adding or deleting words in bulk, and directly loading or saving user dictionaries from or to sideways RAM.

Additional star commands

These can be issued from any language ROM such as spreadsheets or BASIC (they can even be included into BASIC programs). Some of the 8 commands are:

***CROSSWORD** - Will search the entire dictionary for words that exactly fit the search pattern. For example *CROSS. ##M#U#ER would list ARMOURER, COMMUTER, COMPUTER. It takes about 8 seconds to check against all 59,000 words.

***ANAGRAM** - Will list all the words in the dictionary that contain the same letters as those specified.

***FUZZY** - Will list all words that sound something like the one you are searching for. If you are not sure of the spelling of a word then entering the approximate spelling here will generally list the word you are looking for.

Price: £59.00 incl.

Upgrades

Owners of the older two chip versions of SPELL-MASTER can upgrade to the single chip version for £25.00. However this new version is functionally equivalent and so it should not be necessary to upgrade.

2nd processors

Due to its unique design SPELL-MASTER will not work with word processors running on the 6502 2nd processor, although there are facilities provided for checking long text files.

VISA Computer Concepts Access

Gaddesden Place, Hemel Hempstead, Herts HP2 6EX Telephone: (0442) 63933

ADVENTURE PLAYGROUND

Newcomers to adventuring can be disenchanted before they reach their first game problems says Mike Gerrard

One thing it is easy for old hands at adventures to forget is that new people are discovering adventures every day. It is more difficult for me to forget it because in the various magazines for which I write; readers are constantly reminding me not to overlook the needs of absolute beginners. This has been particularly true in our sister publication, *Putting Your Amstrad to Work*, where I have had many letters from people just buying Amstrad PCW and PC machines and asking me to recommend adventures for beginners, or asking how to solve problems which seem reasonably straightforward to the more experienced player.

I knew one reader was getting into the spirit of things when he wrote to me about *Aftershock*, in which he was having difficulty getting a ramp away from an elephant. He said that he had tried everything of which he could possibly think, even to the extent of hitting the elephant with a pickaxe he had found, but he had to report that the elephant was not amused.

That is partly what adventuring is about – and I mean hitting elephants with pickaxes, along with all the other crazy things you try when you are desperate to solve a problem. Incidentally, I told the reader the answer to the problem was glaringly obvious, as the elephant liked what all elephants like. He wrote to say that he had been forced to go to friends doing a Les Dawson to find what this was: "If I am going to get a ramp off an elephant I have to give it a BLANK or BLANKETY-BLANK." He discovered that everyone in the world, except him, seemed to know that elephants like buns.

The co-operation you can get from other people is one way of learning about adventures. If you are stuck on a problem, you should not hesitate to send a letter to me, or to any of the many helpline services available. You will find on the whole that adventure players tend to be very friendly. I know of many people who seem to spend all their spare time answering other people's problems and, if you subscribe to one of the specialist adventure magazines, you will discover addresses and advice galore.

If you are a newcomer to adventures, I recommend that you start taking at least one adventure magazine. Since the demise of *Micro Adventurer*, there has been no magazine from a commercial publisher devoted exclusively to adventure games but enterprising adventurers have started publishing their own magazines.

The most professional-looking, and hence the most expensive, is *What Now?* and costs £1.50 from H&D Services, 1338 Ashton Old Road, Higher Openshaw, Manchester M11 1JG. It was originally under the title of *The Adventurer's Handbook*, and the latest issue is 80 pages long. It includes reviews and general articles and is rapidly expanding to take in almost every aspect of the adventure world but, like many magazines, it will always be centred on the hints, solutions and maps it publishes. The most recent issue includes no fewer than eight excellent professionally-drawn full maps, for games as small as the budget title *Zacaron Mystery* on the Spectrum, and as large as Infocom's *Enchanter*.

Do not be ashamed to look at the answers to problems if you are just starting adventure games and feel you need help, as it will not be long before you will be solving everything yourself – well, almost everything. The reason you are in difficulty may be that you are not typing-in the exact phrase needed to solve a particular problem. The parsers of some adventure games are more limited than they should be, and *Aftershock* is an example. I know many seasoned players who were stumped by an early problem, in which you had to get out of a lift by climbing on a chair, removing a panel in the ceiling and then climbing out of the lift. Having got on the chair and removed the panel, the only command which will work is CLIMB OUT OF LIFT.

That might seem straightforward with hindsight – the solutions to most problems are glaringly obvious once you see them – but it took me half an hour to hit on the correct combination of words. Commands like GO THROUGH PANEL, CLIMB THROUGH CEILING, CLIMB INTO HOLE and even CLIMB OUT OF THE LIFT would not work; it had to be those precise four words and nothing else. That is bad programming, so do not take it as meaning that you are a poor adventure player if you are stumped by something like that.

Back to the magazines, and *Insight*, which is only 28 pages or so each issue, concentrates exclusively on hints and solutions and costs £1 from Ron Dawson, 41 Union Court, Westgate, Otley, Leeds LS21 3AS. It is also fairly well-established, in a field where some magazines appear for a few issues and then disappear, and is well supported by avid adventurers like John Barnsley and John Wilson, who have each solved more than 100 adventures.

Two more excellent publications emanate from Wigan; I suppose I could say they are magazines with no peer but I will not. It is noticeable that all the magazines I have mentioned are published in the north of England. The two Wigan magazines are both very different and if you think you will be interested in adventure writing, whether programming them yourself with advice from the likes of my little brother or using a utility like *GAC*, *Quill* or *PAW*, *Adventure Contact* will be an essential buy. It concentrates on the writing, publishing and marketing of adventures and a sample issue costs £1



● **Left: This is what to expect when you begin adventuring.**

from Pat Winstanley, 13 Hollington Way, Wigan WN3 6LS.

The companion magazine is *Adventure Probe*. It is much more the general adventure magazine, with reviews, maps, letters, software swaps, a telephone helpline service and several pages containing the addresses of people prepared to offer help on a bewildering variety of titles. A sample issue costs £1 from Sandra Sharkey, 78 Merton Road, Highfield, Wigan WN3 6AT.

Striking a rather solitary blow for the south of England is the Adventurers' Club Ltd, 64-c Menelik Road, London NW2 3RH. A stamped addressed envelope to that address will bring an outline of the club's many services. If you have difficulty obtaining copies of adventures, with some shops seeming reluctant to stock more than the few best-sellers, the Adventurers' Club includes an adventure sales service among its offerings. It also publishes a regular dossier containing the usual mix of reviews and solutions, plus competitions. It manages to attract articles from leading names in the adventure field, like Fergus McNeill and Pete Austin of Level 9, who is the club's honorary president.

There are other magazines, some on tape for loading into a micro, but the ones that I have mentioned cover all computers and I also see them regularly so can recommend them in the knowledge that they do arrive in the post month after month.

I mentioned that one of the adventure-solving hurdles is the parser in the game. It is the part of the program which interprets what you type-in. In the example given, the parser for *Aftershock* has been told to accept only CLIMB OUT OF LIFT at that point in the program before taking the player to the next location. A better parser would accept a much wider range of inputs, provided the

ADVENTURE PLAYGROUND

player could show the right intention, had climbed on the chair, removed the panel, and was trying to get through the hole in the ceiling.

Newcomers to adventuring have to become accustomed to parsers, though, and their occasional limitations. Despite the ever-improving parsers, like those of Infocom, Magnetic Scrolls and Level 9, the majority of adventure games published will still work on a simple VERB-NOUN basis. You have to get used to thinking in those terms and that causes many a newcomer to come to grief, or at least to a temporary halt. Where in normal English you would expect to say something like GO THROUGH THE DOOR or WALK THROUGH THE DOOR, in the two-word adventure language that often becomes the rather ungrammatical GO DOOR.

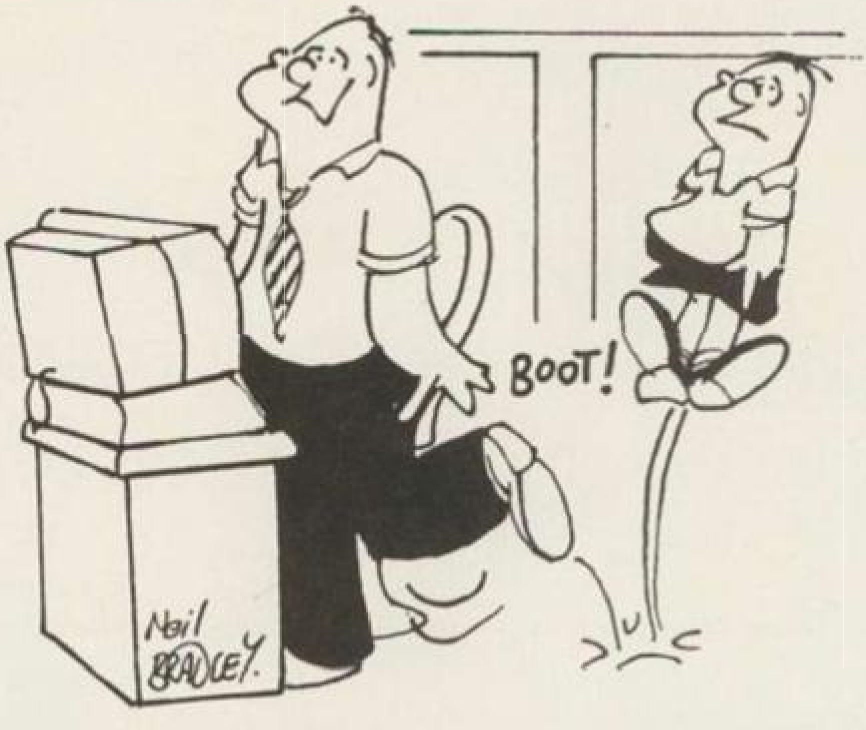
If it is the door to a cottage you might also try GO COTTAGE or ENTER COTTAGE. A frequent irritation, to me at least, is when a program will accept a simple S (for SOUTH) to take you out of a location, but insists on ENTER LIBRARY instead of just N (or NORTH) if you want to return there.

When you are used to adventure games you accept these things as the minor nuisances they are but beginners may well be baffled and feel the fault lies with themselves. Even worse, they may be disenchanted by adventure games forever by an unlucky choice of game as a first attempt.

What should you choose as your first attempt? Many people have heard of Scott Adams as being the first man who brought the large-scale mainframe adventure to the humble 16K home micro, as they then were, and therefore feel that for historical reasons they will start with a Scott Adams game, perhaps also thinking that those old games must automatically be easier and smaller-scale than more recent titles.

That is not so and I would never recommend a Scott Adams game for your first foray into adventures. I would be reluctant to recommend any of them to anyone at any stage, as I find the screen layout to be confusing, some of the problems to require needlessly complicated solutions, and the location descriptions so brief that there is no sense of reality or atmosphere about them.

"You are in a room" is about the extent of a typical Scott Adams piece of text. It is not even "You are in a purple room" for lovers of purple prose.



If you have a Spectrum, Tartan Software has just released what the newcomer needs. It is a tape of adventures called *Six-in-One*, which includes six adventures aimed specifically at beginners, along with an introduction to adventure playing generally. The adventures increase in difficulty and have a range of settings, also making use of typical adventure problems like how to climb down a cliff or how to use magic spells.

The first two titles have complete solutions built into the program, which you can call up a section at a time by typing HELP. Recommended at £4.95, mail order only, from Tartan Software, 61 Bailie Norrie Crescent, Montrose, Angus, Scotland DD10 9DT.

Another excellent introduction, I feel, is the Level 9 *Red Moon*, which is available for most machines. It allows you to explore many locations without necessarily having to solve problems or suddenly finding yourself killed for no apparent reason.

Emerald Isle, from the same company, was issued specifically because Level 9 had received many letters complaining that its adventures were too difficult, so it decided to publish one tailored more to the beginner, with early problems being fairly easy but increasing in difficulty without suddenly confronting you with an almost impossible problem in the early stages. Some adventures take that approach, incidentally, so be wary of those which begin by placing you in a sealed room with no objects to help you and expecting you to provide some obscure command like SMASH HEAD AGAINST BRICK WALL if you are to escape.



Never forget that everyone has to start somewhere and it is important to go back to basics from time to time. Those who have been adventuring for a time and are keen to know more about the latest state-of-the-art game will be well catered for in the next few issues. With the Infocom 256K of *Bureaucracy* soon to be inflicted on us, followed closely by *Guild of Thieves* from Magnetic Scrolls and the Level 9 *Knight Orc*, there is certainly plenty of excitement in the offing.

I have received several letters from readers complaining that they have sent £1 to Rainbird for hint sheets on *Jewels of Darkness* and *Silicon Dreams*, as requested in the packaging, and have then heard no more about it despite follow-up letters, including SAEs. I have now written twice to Rainbird asking about the delay and have had no reply. Someone who is always courteous enough to reply is Pete Austin of Level 9 and even he cannot find from Rainbird what is happening with the promised solution sheets. He has asked me to tell anyone waiting for clue sheets on either of the Level 9/Rainbird trilogies that they should just send a 9in. x 6in. stamped addressed envelope direct to Level 9 with the details and proof of purchase if possible, and the Level 9 normal full solution sheet service will fill the gap.

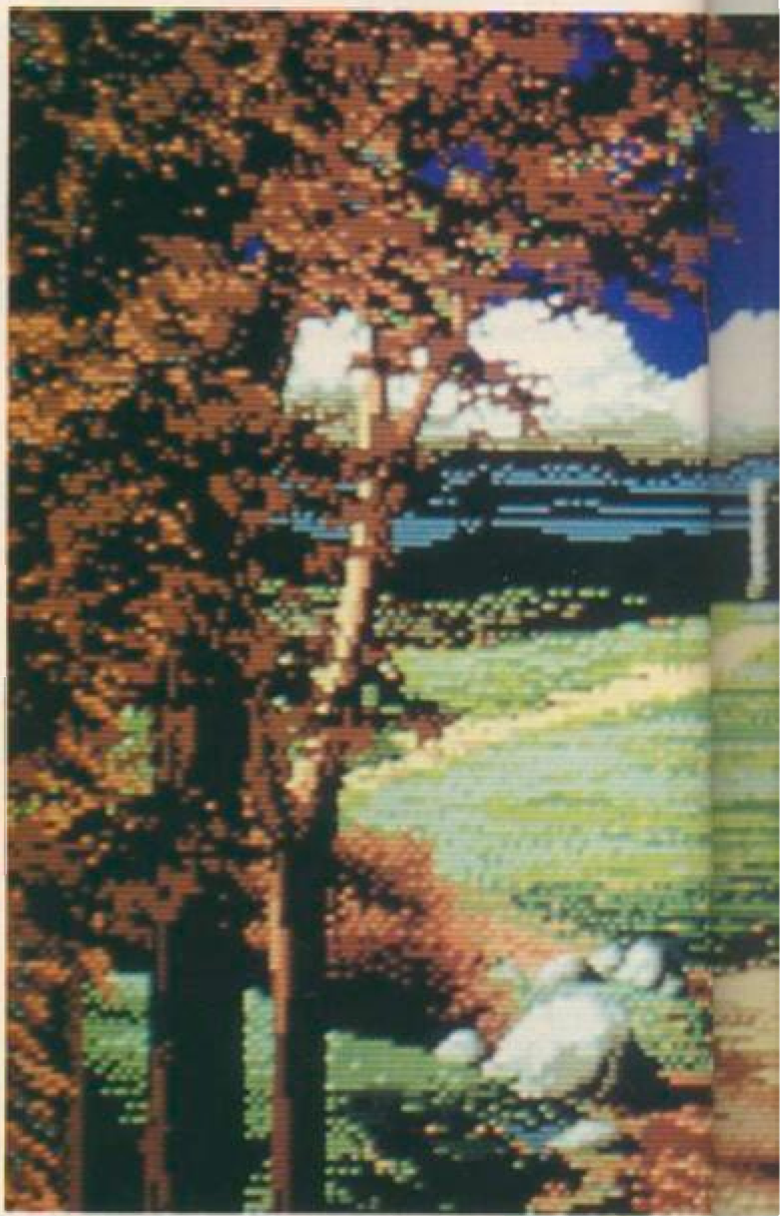


● Fanfare to rival any brass section.



CROWN
GLO

CINEMAWARE IS THE LASTEST GAME CONCEPT FROM MINDSCAPE. THIS FIRST TITLE MIXES ARCADE AND ADVENTURE THEMES IN A WORLD OF STUNNING GRAPHIC DISPLAYS



● An Englishman's home is his castle.

Take yourself back to a time when men were men, and women loved it. A time when heroes reigned supreme, and baddies were hanged, drawn and quartered (and that was if they were very lucky). All this and more can be experienced in the comfort of your own living room, providing that is you have a Commodore Amiga and a copy of *Defender of the Crown*, by Mindscape (distributed in this country by Mirrorsoft).

Defender of the Crown is the first in a series of Mindscape games to be released under a sub-label called Cinemaware which, as its name suggests, is intended to be a new generation of games more similar to interactive movies than *Space Invaders*. To make sure the game created a real stir, Mindscape spared no expense in its development, hiring two of the most outstanding Amiga programmers around, R. J. Mical and James Sachs. To put things into perspective, Mical was hired to take over the graphics side of the program, something he ought to be good at, considering he was responsible for designing and programming the Amiga graphics chip.

Like most recently released games, it requires you to have version 1.2 of Kickstart, and twin disk drives unless you want to be continually interrupted by disk change requests. Almost immediately upon loading it becomes clear that *Defender of the Crown* is something very special indeed. The game starts with an orchestral fanfare, and continues to tell the storyline of the game. You take on the role of a good Saxon who must gain as much land as possible while defending your castle from restless Normans.

To help you in your goal you can call upon Robin of Sherwood to aid your troops in times of dire need. But be warned, you can only use Robin three times, after which he will politely tell you to "Go away!!!!".

As with most Amiga games, *Defender of the Crown* is



● **Making your choice of opposition and weapons.**

N I N G
R Y





l you
ps in

hich
"Go

nes,

played completely using the mouse, although there are times where this becomes annoying. Generally it is preferable to deplorable microswitch joysticks.

In play, Defender has five 'games within a game', and it is this which makes the game so long-lasting. The first action that confronts the unwary player is a tournament. These are held all over England, and are essential to any plans of empire building.

All a tournament really consists of is a series of jousting contests against various opposition. Each individual joust can be either for fame or, more profitably, for land. As with the game in general, the graphics in this section are stunning, with charging horses, waving maidens and animated exchanges.

If you win all three of your jousting matches, you can accumulate a large amount of land, which in turn soon starts bringing in enough revenue to hire more soldiers, and buy more castles and equipment.

If you are the daring type you can always instigate a sortie on one of your opponent's castles which, if successful, will earn you a fortune in gold. Anyone familiar with Errol Flynn as Robin Hood will immediately feel at home on these raids, as you and your merry men use all your skill and determination to battle past some resilient baddies.

Once you are past the first group you must penetrate the inner section of the castle, and here your swordmanship is really put to the test. Again, the graphics are of an incredibly high standard, with flickering torches illuminating your passage and reflecting off your blade as you fight.

Red-blooded males are also catered for in *Defender of the Crown* with a fair maiden who must be rescued from the devilish grasp of some Normans. If you are successful in your rescue, the gentle lady falls head over heels in love, and devotes herself to you for eternity.

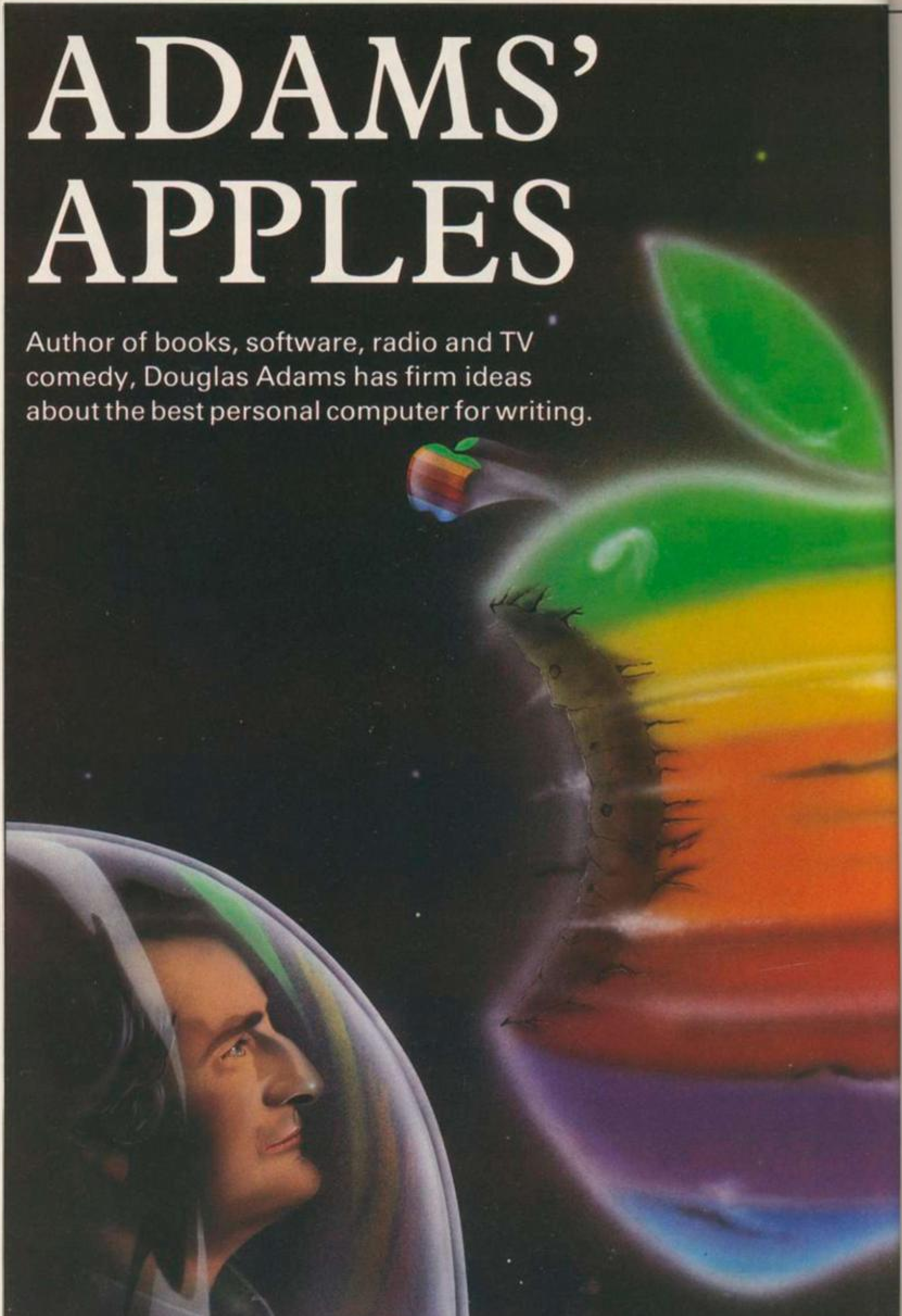
For sheer quality of animation, the castle-raiding section is unbeatable. Using glorified catapults to hurl huge rocks at the enemies castle, you must successfully create a hole big enough for your men to charge in and wreak destruction on all the inhabitants.

Overall, *Defender of the Crown* is a spectacular game. The graphics are incredible, and unsurpassed by any other game yet released. In technical terms too, the game is remarkable. Very few programs of any kind have taken advantage of the multi-tasking abilities of the Amiga, but *Defender of the Crown* really does, with screens loading at the same time as you are playing a game, and screens switching in and out almost instantaneously.

One criticism that can be levelled is the lack of gameplay. Sometimes there is almost no player participation for minutes on end, and this does become slightly tedious. Nor is it cheap, at around £40. However, Amiga fans who want the finest games for what can only be described as the finest machine will find it hard to avoid buying this classic.

ADAMS' APPLES

Author of books, software, radio and TV comedy, Douglas Adams has firm ideas about the best personal computer for writing.



"BEING A PERFECTIONIST IN A WORLD WITH DEADLINES MEANS THAT A LOT OF YOUR OUTPUT IS OVER-WRITTEN AT THE EXPENSE OF THE REST"



Douglas Adams' latest book features a character who owns no less than six Apple Macintosh computers. When rumours reached us that this was the same number owned by Adams himself, we decided to investigate further. How can anyone make use of six identical machines?

"Actually, I have only five at the moment, but I see your point. I keep four here and one in New York. One is for my secretary, one for my girlfriend, and I need two on my desk. I'm working on the sixth; it's going to be a Mac II when I can get hold of one. I need two machines on my desk mainly because of number of times I find myself doing two things simultaneously.

"Most of the different types of music-making software are incompatible with each other; they each have different editing capabilities and structures – and the best way to get music from one sequencer package to another is to play it over the MIDI, which is laborious. There's no equivalent in music to the straight ASCII text file which enables you to port documents between different word processors, and until there is one you are really going to need two computers for music applications. But I would probably still need them anyway: as well as the sequencer programs there are patch editing programs, library programs, sound wave programs for sound sampling, and it's actually beyond the ability of the Switcher to keep them all co-habiting happily at once."

The rows of compact disks adorning one wall of the room would not disgrace a record shop but don't declare any particular bias. What is your musical background?

"I have been something of a musician all my life. I began, oddly enough, in the school choir. One of the advantages of being male is that if you stick at choir singing for the right years you end up singing all the different parts, from teble to alto to tenor to bass. If you work through a large proportion of Bach, as we did, you can't help but learn from the experience, the harmony and the counterpoint. At the other end of the scale I taught myself the guitar pretty thoroughly. The one thing I was never very good at was keyboard playing, because I never wanted to practise when I started at the age of eleven. I'm extremely left-handed, without much dexterity in my right hand, and I kept getting it wrong. I've always retained the ability to read and write music, but much as I read and write French – slowly, with a dictionary, and being drunk is extremely helpful!"

Have computers made the process easier?

"One of the breakthroughs with music applications for computers is that if you have the ideas and the basic skills, it doesn't matter if you happen to lack the dexterity. You write on the computer, and it does the playing for you. That was a revelation. Computers can relieve you from doing things you can't do very well. I found that I had a certain ability to write music, but that the mechanical nitty-gritty of writing it all down and playing it had prevented me developing what talent I had. The moment I started writing music on the computer screen I started learning very fast. In the past I would write down a rhythm and never be sure if I had got it quite right. The only way of checking was to read over the notes, and naturally in a situation like that you hear what you think you have written rather than what's really there. If you write it on the computer screen you get instant playback; it stops you making silly mistakes. It's a very good illustration of the way computers can help in all kinds of learning, simply because the feedback is instantaneous."

Do you have any plans to unleash your music on the public?

"I'd like to, though I don't know where I'd fit it in. Time is always a problem. When I was writing *Dirk Gently* I was collecting the synthesisers and music programs. Sometimes I would decide to spend half an hour on them as I was settling down to write, and I'd suddenly find it was midnight. Eventually I had to dismantle it all and put all my synthesisers in the wardrobe. Then I wrote the book, and I've only just been putting them back together again. The thing I've had the most difficulty with is the two networks; there's the MIDI network which deals with information and the audio network which never works. There are always a variety of crackles and hums on the audio side which irritate me greatly. I prefer the computer side."

You started writing *Hitch-Hiker* in 1976 – before word-processing on a microcomputer had become possible. When did you first become interested in the idea of using a computer for writing?

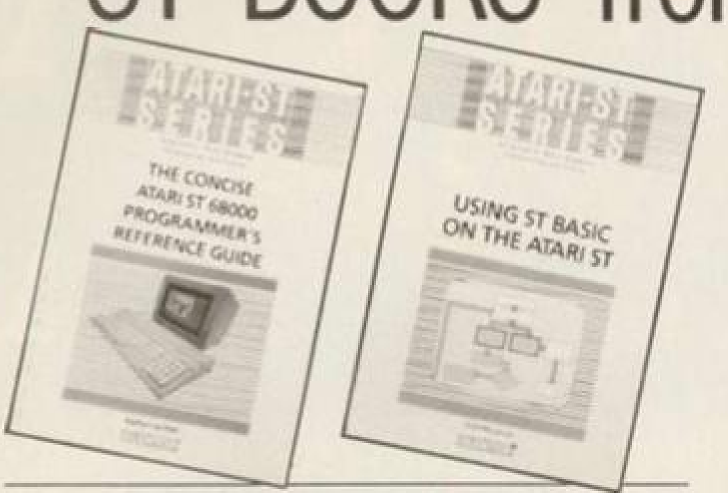
"When I started writing Hitch-Hiker I was taking the mickey out of technology, writing a kind of anti-science fiction. I spent so much time writing and re-writing that I would frequently get to a stage where the first ten per cent of the script was absolutely perfect but there was only ten per cent of the allotted time left over to do the rest."

Is that the price of being a perfectionist?

"Being a perfectionist in a world with deadlines means in the end that a lot of your output is if anything over-written at the expense of the rest. You quickly encounter a law of diminishing returns, with a huge amount of time making a tiny difference to the good parts, and then the need to meet a deadline forces you to leave some passages a great deal less than perfect. The balance is never exactly right.

"In theory using the computer should save me a lot of time. I would frequently retype a whole page just to make a minor change to a speech. Somehow, though, the work still expands to fill slightly more time than I have available."

ST BOOKS from GLENTOP



THE CONCISE ATARI ST 68000 PROGRAMMER'S REFERENCE GUIDE

Katherine Peel

This book is a complete reference manual for the ST computers. It is designed to be used both as a quick reference manual and as a source of detailed technical material. Topics include machine-code programming, details of GEM, and the operating system. Much of the material included is unlikely to be available from any other source, making the book an essential reference manual for every Atari ST owner.

Price £15.95 ISBN 1 85181 017 X

USING ST BASIC ON THE ATARI ST

Dick Meadows

This book explains Atari ST BASIC to both the newcomer to programming and to the programmer unfamiliar with ST BASIC. It covers many features of ST BASIC, including ideas and methods for programming, beginning to write programs, the input and output of information, making decisions, repetition, special functions, processing strings of text, and using arrays, procedures and user defined functions. The book contains many worked examples.

Price £7.95 ISBN 1 85181 051 X

Other titles in the series

Using LOGO on the Atari ST
Practical LOGO on the Atari ST
Practical BASIC on the Atari ST

All titles available from your local dealer or bookshop. However, in case of difficulties they can be obtained direct from Glentop – postage & packing £1 (UK) £2.50 (Overseas).

VISA

The Glentop Press Ltd
Standfast House
Bath Place
High Street Barnet
Herts EN5 5XE

Tel: 01 441 4130

MAKE YOUR INTERESTS PAY!!

Train at home for one of these Career Opportunities

More than 8 million students throughout the world have found it worth their while! An ICS home-study course can help you get a better job, make more money and have more fun out of life! ICS has over 90 years experience in home-study courses and is the largest correspondence school in the world. You learn at your own pace, when and where you want under the guidance of expert 'personal' tutors. Find out how we can help YOU. Post or phone today for your **FREE INFORMATION PACK** on the course of your choice.

Introduction to Computer Programming	Programming in BASIC
Programming in COBOL	Electronics
Electrical Engineering	Electronic Engineering
Elec. Contracting/ Installation	Radio, Audio and TV Servicing
GCE over 40 'O' & 'A' level subjects	

Course of Interest ....

Name ____________________

Address ____________________

____________________ P. Code ________

ICS International Correspondence Schools, Dept. ETS57
312/314 High St., Sutton, Surrey SM1 1PR.
Tel: 01-643 9568 or 041-221 2926 (24 hours) YC 5/87

ATARI COMPUTERS



All All ST computers come with mouse and software. Atari 1040STF without monitor £542 (£529) £569. Atari 1040STF with b/w monitor £637 (£638) £728. New Atari 520STFM with built in disc drive (512K ram) £363 (£360) £400. Atari 520STFM+ (1000K ram) £452 (£445) £486. Atari 520STFM with b/w monitor £458 (£470) £560. Atari 520STM £263 (£265) £304. Atari 520STM+ (1000K ram) £352 (£348) £387. Cumana 1000K disc drives for the 520STM:- single £147 (£147) £163, dual £242 (£236) £260. Atari 500K ST disc drives £119 (£129) £135. Atari 1000K ST disc drives £183 (£182) £198. Atari ST monochrome monitor £137 (£147) £195. Atari 12" medium resolution ST colour monitor £368 (£362) £413. 20 Megabyte ST hard disc (Now available from stock) £636 (£613) £673. Centronics printer cable for the ST range £16 (£16) £20. We offer good discounts on most ST software for example:- Hisoft DEVPAK £42 (£42) £46. Metacombo Lattice C £81 (£81) £85. Computer Concepts Fast Basic £79 (£76) £80. LDW Basic ST, new basic compiler £89 (£88) £92. VIP Professional, Lotus 1-2-3 Clone for ST £159 (£139) £143. Pro Fortran 77 £121 (£108) £112. Pro Pascal £121 (£108) £112. Atari 130 XE computer + game £95 (£99) £120. Atari 130XE + disc drive + 1029 printer + software £313 (£315) £373. Atari cassette recorder £34 (£38) £48. Atari 1020 4 colour printer £93 (£94) £114. Atari 1029 dot matrix printer £118 (£124) £151. Atari 1050 disk drive with DOS 3 £118 (£124) £151).

SINCLAIR PRODUCTS AND CAMBRIDGE COMPUTERS

Spectrum 128K Plus Two computer:- without joystick and software pack £148 (£150) £180, with joystick and software pack £158 (£162) £194. Blank microdrive cartridges for the QL and the Spectrum £2.50 (£3) £4. QL floppy disc interface (See Cumana disc section for suitable drives) £86 (£84) £94. Spectrum floppy disc interface (See Cumana section for suitable disc drives) £76 (£76) £86. Spectrum centronics printer interface and cable £46 (£42) £47. Cambridge computers Z88 £297 (£271) £299. Mains adaptor £15 (£17) £22. 128K ram cartridge £65 (£57) £62.

COMMODORE COMPUTERS

Commodore Amiga A500 Computer £533 (£524) £574. Modular £25 (£35) £25. Amiga A500 with 1080 colour monitor £848 (£839) £946. Commodore 128 computer + software + joystick £223 (£223) £265. Commodore 128D £518 (£499) £539. 1571 Disc drive £276 (£269) £285. Commodore 64C computer £185 (£185) £210. Commodore 64C computer with mouse, cassette recorder and software £239 (£242) £272. Convertor to allow the use of most ordinary mono cassette recorders with the Commodore 128 and Commodore 64 £9.78 (£9) £11. Commodore MPS1000 printer £269 (£262) £296. 1541C disk drive £194 (£192) £208.

AMSTRAD PRODUCTS

We can supply a wide range of software for the 1512, the PCW8256 and the PCW8512 – write for a quote. New Amstrad 1512 IBM Personal Computer Clones:- 1512 computer with single disc drive and b/w monitor £499 (£499) £606, dual disk b/w £619 (£614) £621, single colour £669 (£655) £762, dual colour £771 (£745) £852, 10MB hard disc b/w £863 (£830) £970, 20MB HD b/w £951 (£907) £1047, 10MB HD colour £1014 (£961) £1101, 20MB HD colour £1102 (£1038) £1178. DMP3000 printer £190 (£183) £226. FD3 £166 (£173) £204. HD10 £467 (£430) £490. HD20 £575 (£540) £600. Amstrad CPC464 computers:- colour £291 (£320) £404, green £197 (£235) £316. Amstrad 6128 colour £391 (£420) £500. Amstrad PCW8256 £440 (£464) £571. Amstrad PCW8512 £564 (£577) £684. Amstrad DMP2000 printer £166 (£171) £204. Extra disc drive for Amstrad 6128 £99 (£105) £136. Amstrad DD1 Disc Drive £155 (£156) £186. Amstrad joystick £11 (£12) £16.

CUMANA 3.5" AND 5.25" CASED DISC DRIVES WITH CABLE AND POWER SUPPLY

40/80 track switchable double sided, to suit floppy disc interfaces of the Sinclair QL, Sinclair Spectrum and BBC B. 3.5" drives:- single £134 (£134) £156, dual £224 (£219) £251. 5.25" drives:- single £172 (£169) £199, dual £310 (£306) £347.

PRINTERS

Epson LX86:- without tractor £276 (£275) £309, with tractor £300 (£298) £342. Star NL10 £235 (£234) £270. Interfaces for NL10 £37 (£35) £37. Brother M1109 £220 (£224) £265. Shinwa CTI CPA80+ £208 (£210) £247. Cannon PW1080A £303 (£298) £338. Microperipherals MP165 £219 (£223) £265.

SWANLEY ELECTRONICS
The Computer Export Specialists
Dept. YC, 32 Goldsel Rd., Swanley, Kent BR8 8EZ, England
Tel: SWANLEY (0322) 64851

Official orders welcome. UK prices are shown first and include post and VAT. The second price in brackets is for export customers in Europe and includes insured airmail postage. The third price is for export customers outside Europe (including Australia etc) and includes insured airmail postage.

Experience on *Your Computer* shows that in some cases word-processing software can make it *too* easy to make changes. The temptation is always to make just one more slight revision, often at the expense of much-needed time. Do you find it harder to reach the stage where you can regard your work as finished?

"Immensely. A very interesting thing occurred in the last stages of *Dirk Gently*. I was doing the typesetting on the Mac, largely to buy myself extra time past the deadline, and I suddenly realised that for some reason I'm allergic to hyphenation. I caught myself rewriting a line in order to make it look better on the page, which is mildly ridiculous.

"Incidentally, since I did that exercise I've found it almost impossible to read a book for pleasure. The sense of it hasn't been going in because I've been concentrating on its appearance."



"I HADN'T THE FAINTEST INTEREST IN GAMES – I THOUGHT THEY WERE ALL ABOUT SHOOTING LITTLE ALIENS".

Is *Dirk Gently* the first project that you have word-processed from start to finish?

"I think I first used a word processor in late 1982. I spent several months in Los Angeles – which I hated – and while I was there I acquired a DEC Rainbow. I didn't really know anything about it at the time, but the great thing about it was supposed to be that you could run eight-bit CP/M *and* sixteen-bit MS-DOS software. Unfortunately hardly anyone wrote anything for it, which made the whole exercise rather pointless. Anyway, I cut my teeth on that machine, with various versions of Wordstar. But the only really good programs I could find for the Rainbow were the Infocom games. Whenever a new machine comes out they're among the first with the software. I hadn't the faintest interest in games at that stage – I thought they were all about shooting little aliens and chasing them round mazes. The first Infocom adventure I played was *Suspended*, and it was a revelation. I was startled by it – here was something that was witty, intelligent and literate. I enjoyed it very much. A mutual friend put me in touch with the people at Infocom and I spent a day with them; we got on extremely well and I ended up doing the *Hitch-Hiker* game for them.

"I replaced the Rainbow with an Apricot XI. I still wasn't really happy with that. I knew I was getting hooked on computers but I still hadn't got the right machine. Then one day when I was at Infocom they showed me a funny-looking machine which turned out to be the Macintosh. In the first few seconds I fell in love with it. I started playing with *Macpaint* and I felt instantly at home with it. I bought one as soon as I could; in fact, I think mine was the first ever Macintosh in this country. Thinking back now about how feeble the original 128K machine was, it all seems rather naive, but I fell in love with the potential of the Macintosh concept as much as with its actual capability at that time."

What software do you write with?

"*MacAuthor*. It's a British program, very powerful. One of the many nice things about it is the attitude of the authors, Icon Technology. They are incredibly responsive to user feedback. They update versions fairly regularly and they constantly add features which people have asked for. Mike Glover, who runs the company, came over to help me with the typesetting, to see how the program actually worked for professional writers, and to see if I had any complaints. They are about to do a major revision; in fact they're starting from scratch with completely new code.

"Of all the word processors available for the Mac it's the only one with which you can write and typeset a novel, including the new Microsoft *Word 3*. *Word 3* is a very powerful and infinitely configurable, and so is *MacAuthor*, but the difference is just three lines of code which give you something called smart quotes. The kind of output you get on a typewriter and most computers up to now isn't typeset quality because computers use generic quotation marks – the same vertical mark at either end of the quotation. Entering proper opening and closing quotation marks is extremely difficult and error-prone on the Mac, even if you can remember to do it. But with smart quotes, *MacAuthor* automatically determines whether you want an opening or a closing mark and acts accordingly."

Computers are certainly prominent in *Dirk Gently* but they are not crucial to the plot. Given your interest have you ever been tempted to make them a central theme?

"I wouldn't want to make something primarily about computers, because the technology changes so fast that whatever you write will be very rapidly out of date. I'm more interested in the things you can do with computers than with computers themselves. In fact I'm just about to start work on a new book, which I've got to get done by the end of this year, and it's come out of a rather neat little idea I've had about the way you use word processing programs. I think the reason the Mac has started to feature in the book is that I spend eight to ten hours a day sitting in front of it."

But there is a lot of computer-related material in *Dirk Gently* . . .

"I tried to put in something which not everyone would understand, but keep it to a minimum. Anyone who does understand it is going to be pleased, but on the other hand anyone to whom it isn't immediately familiar will be able to understand it from context. They won't be turned off by the idea that something is being directed past them. It's detail which you may as well get right. It's like horse-racing and Dick Francis – I love Dick Francis but I've never been near a horse in my life. I always find that I've learned something about horses by the end of one of his books, and I am sure that is a key reason for his success."

There are one of two places in *Dirk Gently* where you sound rather cynical about the way computers are used by the military.

"The whole thing about military high technology and Star Wars is that anyone at all involved in computers knows that it can't be relied upon to work. Software always needs nursing along and tweaking up, and the idea of a sudden emergency coming about and all this untested software coming into operation is ridiculous."

You seem to have a talent for spotting the absurdity of many mundane things . . .

"The contrast between the ordinary and the extraordinary fascinates me. I particularly enjoyed writing *Dirk Gently*, but it is no secret that I was unhappy about the last of the Hitch-Hiker books, *So long and thanks for all the fish*. I'd run out of steam on Hitch-Hiker because I tend to work best where the mundane and the bizarre meet and towards the end

of Hitch-Hiker there was nothing ordinary left. I was aware of this and trying to bring it all back to Earth, but Arthur Dent, whose original role was to be the ordinary guy, was now the stranger, and he was no longer our representative. The whole thing got cock-eyed."

Tell us something about your latest Infocom adventure, *Bureaucracy*.

"It involves you in increasingly horrendous adventures, great disasters, catastrophes, and you end up lost in the jungle being pursued by natives. Your basic objective is to get your bank to acknowledge a change-of-address card, and everything flows from that.

"When I started work on the game with Infocom it became a much more collaborative thing than Hitch-Hiker, because everybody had bits they wanted to put in. Generally the response I've had is 'Yes, this has happened to me!' The sensation of having someone recreate these horrors for you makes people share them – a kind of catharsis in a computer game.

"At Infocom they have long wanted me to do a second Hitch-Hiker game but I think I'd much rather base my next adventure game on my experiences of trying to get a movie made of Hitch-Hiker in Hollywood. That was a bizarre experience. The role you would play would be Shakespeare transplanted to Hollywood and trying to get *Hamlet* made as a film."

What are the differences between writing an adventure and writing a novel?

"It's a totally different way of thinking. When I was first told about adventure games I didn't really like the idea. The writer seemed to be abdicating responsibility for the plot; if the player was making it up as he went along, the player might as well sit down and write it himself. But in all kinds of ways you the writer have an extra level of control. If you write a book you assume that after a while the reader is on your wavelength, and has picked up what you want him to pick up so you can spring the surprises you want to spring. With a game you know exactly what the player will be thinking or expecting; they can't have got there accidentally. So you can play cat and mouse with the player a great deal more than you can with a reader.

"It's rather like being a practised stand-up comic; you go out in front of an audience and you know the things they're going to try to throw back at you. You always have your response ready and it can sound completely spontaneous even though it isn't.

"When you begin to know how an audience will respond you can begin to tempt them in certain directions, because you're ready for their reaction. It looks as if the performer isn't in control but in fact he is because he is leading the audience to do certain things. You're doing the same thing in writing a computer game."

There's a science-fiction novel, *Dream Park*, in which people go on holiday in theme parks run by the people who now write adventure programs. The players take part in superbly realistic games, complete with simulated animals, nasty weather, black magic and other traditional adventure themes. If the technology becomes available do you think that would be the logical progression?

"It's a good idea. If people could go on simulated holidays it would avoid a lot of environmental damage. A lot of holiday resorts have had to be altered to expectations of the people who go there. It would be much better if the people who wanted that kind of holiday had their holidays simulated for them and the places could be left as they were. If people are going to have a holiday in a synthetic resort it may as well be simulated without damaging the original."

About the Hitch-Hiker game . . .

"I had to do it myself because if I hadn't been involved it wouldn't really have been a Hitch-Hiker game. A lot of people want me to do a comic book but again I'm not interested and if anyone else did it it wouldn't be the real thing. It was only after seeing the Infocom games that I thought that this was something that would be quite fun to do. Coincidentally the Infocom people has been talking about finding some-one to work with who was from a writing background rather than a computing background, and they'd held back because they weren't sure about finding a writer who'd understand the logical structures involved. They hadn't thought of anyone in particular but I was on their list. We spent a day chatting about it and we just got on like a house on fire."

Did you find your lack of computer knowledge a drawback?

"So much nonsense has been talked about the need to be computer-literate. It's the computers that need to be people-literate. There's a great friend of mine who works in Los Angeles, and as I got to know about computers I discovered that this friend was rather more involved than I'd thought. His name is Alan Kay – he invented the whole WIMP idea at Xerox PARC."

Was he one of the people who came up with the idea of the Dynabook?

"The Dynabook was his concept, yes. When I became involved with the Mac I suddenly realised how significant he was, which sent quite a shiver up my spine. He has a very nice analogy for how computers will eventually integrate into everyday life so that they become practically unnoticeable.

"He says he saw a picture many decades ago of when the electric motor was the big new thing which was going to revolutionise our lives. People were rushing around like headless chickens saying that you would be doomed, unemployable, a social outcast unless you were electric-motor-literate. He saw a picture of the home of the future of that time. The artist had drawn it with just one enormous electric motor in the attic. It was running everything in the house off belt drives, the way the Victorian engineers powered their factories with a single stream engine. That, he says, is our current understanding of computers. Eventually computers will disappear into the things we use."

Does this mean that computer magazines will become redundant?

"I doubt it. The activity of computing is always going to be a great deal more interesting than the computers themselves. Right now, though, computers *are* very interesting. The great thing about the Mac is that conceptually it's the least out-of-date computer on the market. While we need more power and flexibility on computers to get them to where they ought to be, it is interesting simply to look at them to see what's wrong with them. You can see what you ought to be able to do with one of these wonderful machines, but you can't quite get there. When each new model comes out everyone wonders if this is finally the machine that will let them do everything they want, so that they can stop worrying about computers and just get on with life.

"Right now, watching the computer industry is like watching the fridge industry in the thirties. People would rush around at parties talking about the fridge they had just bought. There were fridge magazines too, the equivalent of *Your Computer* now, but soon there came a point where the hardware reached a satisfactory state of development so people instantly lost interest. Everyone has a fridge now, and they have revolutionised the way we cook and eat, but you don't feel any urge to talk about the new models.

"That's what I mean when I say computers will eventually disappear. They will still be there, of course, but when they are good enough they will be taken for granted and no-one will pay them any attention.

"An interesting application of the disappearing computer is the colour television. They're so easy to use and so rarely go wrong that you forget that fifteen years ago that it was a pretty laborious task to get a decent picture. Now you just push a button and it works first time. It isn't black magic – it's because of the computer in there."

THOUGHTS & CROSSES
(COMPUTERS) LTD.
33 MARKET STREET, HECKMONDWIKE, WEST YORKS

COMPUTERS

Amstrad CPC464 with colour monitor + £100 FREE software	£299
Amstrad CPC6128 with colour monitor + disk drive	£399
Amstrad PC1512 CM DD (twin drive/colour monitor)	£839
Amstrad PC1512 CM HD20	£1229
Amstrad PC1512 CM SD (single drive/colour monitor)	£711
Amstrad PC1512 MM DD (twin drive/mono monitor)	POA
Amstrad PC1512 MM HD20	£1033
Amstrad PC1512 MM SD (single 320K drive/ mono monitor	£516
Amstrad PCW8256	£458
Amstrad PCW8512	£573
Atari 1040STF including 1Mbyte disk drive	£580
Atari 1040 STF with monochrome monitor	£680
Atari 520STFM	£380
Atari 520STM	£249
BBC Master 128	£499
BBC Master Compact + Philips green screen monitor	£539
BBC Master Compact + Philips medium res colour monitor	£686
BBC Master Compact + TV modulator	£458
Sinclair QL	£129
Sinclair Spectrum Plus 2	£149
ZX Spectrum Plus	£89

CENTRONICS PRINTERS

Amstrad DMP3000 NLQ dot matrix	£195
Canon A-55 NLQ 156col dot matrix	£425
Canon PW1080A NLQ dot matrix	£285
Citizen 120-D NLQ dot matrix	£195
Citizen MSP-10E NLQ dot matrix	£325
Citizen MSP-15 NLQ dot matrix	£325
Citizen MSP-15E NLQ dot matrix	£395
Citizen MSP-25E NLQ dot matrix	£525
Citizen Premiere 35 daisywheel	£649
DMP 2000	£159
Epson LX86 NLQ dot matrix	£285
Juki 6100 daisywheel	£320
Juki 6200 daisywheel	£569
Panasonic KXP 1081 NLQ dot matrix	£189
QMS K8 Laser Printer (8 pages/minute)	£1840

EXTERNAL CENTRONICS INTERFACES

Centronics → RS232 converter	£56
Centronics Interface for Acorn Electron	£19.95
Kempston Interface E (ROM based) for Spectrum	£39.95
QL Centronics Interface	£20
Rampint Interface for ZX Spectrum/+/+2/128	£34.95
RS232 → Centronics converter	£56
Tripler 20/64 for VIC20/64	£50

PRINTER ACCESSORIES

Citizen 1200 single sheet feeder	£105
Epson LX80/86 sheet feeder unit	£65
Epson LX80/86 tractor feed unit	£25
Juki 6100/6200 sheet feeder unit	£220
Juki 6100/6200 tractor feed unit	£169

PRINTER RIBBONS

Amstrad DMP 2000/3000	£5
Amstrad PCW8256/8512	£6.50
Brother EP44	£2.30
Brother HR5/Centronics GLP 1/11	£2.99
Brother M1009/DM5	£3.80
Canon PW1080A/1156A	£5
CBM MPS801	£6.50
Citizen 1200/LSP10	£5
Citizen MSP-10/20 (can use Epson FX80)	£6
Citizen MSP-15/25	£11
Epson MX/FX/RX80/LQ800	£4
Juki 6100 SS	£2
Juki 6100 MS	£3
Mannesman Tally MT80(+)	£6
Panasonic KX-P1081/1080/MTX DMX80	£5
Qume Multistrike IV	£4.30
Seikosha GP100	£4
Star Gemini 10	£2.30
Star NL10/NX10/Gemini II	£7.50

PVC COVERS

Amstrad colour monitor	£4.80
Amstrad CPC464 keyboard	£3.99
Amstrad CPC6128 keyboard	£3.99
Amstrad DMP2000/3000	£4.80
Amstrad Green Monitor	£4.80
Amstrad PC1512 cover set (mono/colour)	£10
Amstrad PCW8256/8512 complete system	£10
Atari 520ST/SM124/SF354	£10
BBC A/B/B+	£3.99
BBC Master 128	£4.50
BBC Master Compact (inc. monitor)	£10
Canon PW1080A/Kaga KP810	£4.80
CBM 16/+4/20/64	£3.50
Citizen 1200	£4.80
Epson LX/GX	£4.80
Juki 6100	£5.60
Panasonic KXP1080	£4.80
Philips 7500 series	£4.30
Sinclair QL	£3.99
ZX Spectrum 128	£3.99
ZX Spectrum Plus	£2.99
ZX Spectrum Plus 2	£3.99

5.25" DISKETTES

Thoughts & Crosses Universal D/S D/D 40T	£9
Thoughts & Crosses Universal D/S D/D 80T	£9
Thoughts & Crosses Universal S/S D/D 40T	£9

COMPACT DISKETTES

Amsoft DF2 3" diskette	£2.99
Amsoft CF2 3" diskettes	10 for £29
Thoughts & Crosses Double Sided 3.5" diskettes	10 for £22
Thoughts & Crosses Single Sided 3.5" diskettes	10 for £16

MONITORS

Microvitec 1431 AP standard res. RGB/CVBS/audio	£235
Microvitec 1431 MS standard res for BBC	£220
Microvitec 1431 MZ standard res for Spectrum	£199
Microvitec 1451 AP medium res RGB/CVBS/audio	£345
Microvitec 1451 DQ medium res for Sinclair QL	£275
Microvitec 1451 MS medium res for BBC	£295
Philips 7502 anti-glare green screen (20MHz)	£82
Philips 7513 anti-glare green screen for IBM	£115
Philips 7522 anti-glare amber screen (20MHz)	£95
Philips 7542 anti-glare white screen (20MHz)	£95
Philips CM8533 med res colour (RGB/composite col/ mono/audio)	£290

LEADS

ACT Apricot/Sirius Centronics printer	£15
Amstrad 464 RGB/power extension	£6.95
Amstrad 464/664/6128 Centronics printer	£10
Amstrad 6128/664 cassette	£2.40
Amstrad expansion port extension	£10
Amstrad PC printer	£15
Atari ST - Philips CM8533 monitor	£15
Atari ST Centronics printer	£15
BBC Centronics	£10
Commodore Amiga Centronics	£15
Commodore Serial IEEE	£5.95
Einstein Centronics printer	£10
IBM Centronics printer	£15
QL joystick adaptor (to use Atari joysticks)	£4.95
QL to RS232 25 'D'	£14.95
RS232 25 'D' to RS232 25 'D' (male/female)	£15
Spectrum 128 joystick adaptor	£4.95
Spectrum 128 to RS232 (25 way 'D')	£14.95

MODEMS

Amstrad complete communications package	£169
Linnet V21/23	£139
WS4000 modem with autodial board	£170

PSION ORGANISER PRODUCTS

RS232 Interface	£47
16K RAM Datapak	£19
32K RAM Datapak	£34
64K RAM Datapak	£79
8K RAM Datapak	£12
Organiser II CM (8K RAM/32K ROM)	£99
Organiser II XP (16K RAM/32K ROM)	£139

ATARI ST PRODUCTS

0.5Mbyte upgrade kit for Atari 520ST	£110
Atari SH204 20Mbyte hard disk unit	£620
Cumana CCA2000S twin 5.25/3.5 DS disk drive	£339.95
Cumana CDA358 dual 1.0M disk drive	£269
Cumana CSA354 (1.0M) disk drive	£139
Logikhron clock module	£40
SF314 disk drive (1.0M)	£190
SF354 disk drive (0.5M)	£140
SM125 monochrome monitor	£100

AMSTRAD PC PRODUCTS

128K RAM upgrade	£30
20 Megabyte hard disk + controller card	£399
FD-3 second disk drive	£169.95
Hard disk backup unit (including cartridge	£530

SPECTRUM PRODUCTS

4 Microdrive cartridges	£7.50
56 way extension to expansion port	£10
AMX mouse	£65
Cheetah Sound Sampler	£49
Extender & reset button	£4.50
Microdrive extension lead	£8
Microslot (2 way adaptor for expansion port)	£6.95
Midi interface	£49.95
Mouse & OCP Art Studio	£69
Multiface 1 (tape to tape/disk/wafa/cart)	£39
Multiface 128	£44.95
SLOMO	£14
Specdrum	£29
Sweet Talker	£22.50

ATARI ST SOFTWARE

Typing Tutor + Word Invaders	Academy	£31.45
Mean 18	Accolade	£40.45
Basketball 2 on 2	Activision	£22.50
Little Computer People	Activision	£31.50
Paintworks	Activision	£31.45
Shanghai	Activision	£22.50
The Music Studio	Activision	£26.95
Strip Poker	Anco	£17.95
Tee Up	Anco	£13.50
CAD 3D	Antic	£45.00
C.O.L.R. Object Editor	Antic	£26.95
Maps and Legends (The Cartographer)	Antic	£26.95
Maps Vol. 1 for above	Antic	£22.50
Print Master	Ariolasoft	£26.95
Bridge 4.0	Artworx	£26.95
dBase II	Ashton Tate	£107.00
Fast Comm	Atari	£45.00
Joust	Atari	£27.00
Degas	Batteries Inc	£35.95
Degas Elite	Batteries Inc	£72.00
Thunder	Batteries Inc	£35.95
ST Accounts	Chipsoft	£155.00
Back Pack	Computer C	£45.00
Fast Back	Computer C	£81.00
Fast Basic Run Time	Computer C	£13.50
Alternative Reality	Datasoft	£22.50
International Karate	Eidersoft	£18.00
Pro Sprite Designer	Eidersoft	£36.00
Sundog-Frozen Legacy	FTL	£26.95
Typhoon	Gremlin	£17.95
Devpac ST	Hisoft	£44.95
Saved! ST	Hisoft	£22.40
EZ Track ST	Hybrid	£54.00
A Mind Forever Voyaging	Infocom	£31.50
Bally Hoo	Infocom	£26.95
Cutthroats	Infocom	£26.95
Deadline	Infocom	£26.95
Enchanter	Infocom	£26.95
Hith Hiker's Guide	Infocom	£26.95
Hollywood Hijinx	Infocom	£26.95
Infidel	Infocom	£26.95
Leather Goddesses of Phobos	Infocom	£26.95
Moonmist	Infocom	£26.95
Planetfall	Infocom	£26.95
Seastalker	Infocom	£26.95
Sorceror	Infocom	£26.95
Spell Breaker	Infocom	£26.95
Starcross	Infocom	£26.95
Suspect	Infocom	£26.95
Suspended	Infocom	£26.95
Trinity	Infocom	£31.50
Wishbringer	Infocom	£26.95
Witness	Infocom	£26.95
Zork I	Infocom	£26.95
Zork II	Infocom	£26.95
Zork III	Infocom	£26.95
K Comm 2	Kuma	£44.95
K Graph 2	Kuma	£45.00
K Spread 2	Kuma	£72.00
Colourspace	Llamasoft	£17.95
MGT	Loricels	£22.50
Ninja Mission	Mastertronic	£8.99
Assembler	Metacomco	£45.00
BCPL	Metacomco	£90.00
Cambridge Lisp	Metacomco	£135.00
Lattice C	Metacomco	£90.00
Make	Metacomco	£45.00
MCC Pascal	Metacomco	£81.00
Menu +	Metacomco	£18.00
Cards	Microdeal	£17.95
Cornerman	Microdeal	£26.95
Electronic Pool	Microdeal	£17.95
Karate Kid 2	Microdeal	£22.50
Personal Money Manager	Microdeal	£26.95
Pinball Factory	Microdeal	£22.50
Trivial Challenge	Microdeal	£17.95
Utilities	Microdeal	£35.95
Plutos	Micro Value	£13.50
Timeblast	Micro Value	£8.95
Balance of Power	Mindscape	£26.95
Art Director	Mirrorsoft	£45.00
Fleet St Editor	Mirrorsoft	£103.00
Strike Force Harrier	Mirrorsoft	£22.50
Mercenary Compendium	Novagen	£22.50
Chess	Psion	£22.50
Arena	Psygnosis	£27.00
Brataccas	Psygnosis	£31.50
Roadwar 2000	U.S. Gold	£22.50
1st Word Plus	GST	£72.00
Xevious	U.S. Gold	£22.50
Arkanoid	Imagine	£13.50
Metrocross	U.S. Gold	£22.50
Ultima II	Origin	£22.50
Gold Runner	Microdeal	£22.50
Wanderer 3D	Pyramide	£22.50
Jewels of Darkness	Rainbird	£18.00
Silicon Dreams	Rainbird	£17.95
Starglider	Rainbird	£22.50
The Pawn	Rainbird	£22.50
Accountant	Sage	£152.00
Accountant +	Sage	£206.00
Book Keeper	Sage	£102.50
Speller Bee	Sage	£45.00
Rhythm	Softechnics	£22.50
Timelink	Softechnics	£30.95
Phantasie 2	Strategic Sim	£22.50
Flight Simulator 2	Sublogic	£45.00
Trimbase	Talent	£81.05
Zkul/West	Talent	£22.50
Printmaster Art Gallery 1	Unison	£26.95
10th Frame	US Gold	£22.50
Championship Wrestling	US Gold	£22.50
Leaderboard	US Gold	£22.50
Leaderboard Tournament	US Gold	£8.95
Rogue	US Gold	£22.50
Silent Service	US Gold	£22.50
Spiderman	US Gold	£17.95
Super Cycle	US Gold	£22.50
Super Huey	US Gold	£18.00
Temple of Apshai Trilogy	US Gold	£22.50
Winter Games	US Gold	£22.50
World Games	US Gold	£22.50
VIP Lite	VIP	£89.95
VIP Professional (text)	VIP	£175.00
VIP Professional (Gem)	VIP	£205.00

IBM/AMSTRAD PC1512 ACCOUNTING SOFTWARE

Financial Manager	Camsoft	£135.00
Payroll	Camsoft	£45.00
Bookworker	Compsoft	£179.00
Easy Accounting	DAC	£88.00
Easy Mate	DAC	£52.00
Easy Tutor	DAC	£31.00
Integrated Accounts	MAP	£135.00
Sales Ledger & Invoicing	MAP	£45.00
Sales & Marketing	MAP	£90.00
Magic	MAP	£90.00
Nominal Ledger	MAP	£45.00
Purchase Ledger	MAP	£45.00
Stock Control	MAP	£45.00
Payroll	MAP	£45.00
MapSpec (SSP system)	MAP	£45.00
Sales Order Entry	MAP	£63.00
Purchase Order Entry	MAP	£63.00
Job Costing	MAP	£99.00
Book Keeper	Sage	£102.50
Accountant	Sage	£154.00
Accountant Plus	Sage	£206.00
Financial Controller	Sage	£269.00
Payroll	Sage	£102.50

BUSINESS PRODUCTIVITY

Homebase	Amber	£63.00
Reflex	Amsoft	£63.00
Sidekick	Amsoft	£27.00
Brainstorm	Caxton	£45.00
Timekeeper	Caxton	£45.00
Dominoe	Compsoft	£90.00
One Up	Compsoft	£45.00
Able One	Conceptdata	£90.00
HAL	Lotus	£124.00
Ability	Migent	£105.00
Moneypower	Moneywise	£90.00
Deskset	Sage	£71.50

COMMUNICATIONS

Chitchat	Sage	£102.50
Chitchat inc Modems	Sage	

DATABASES

Cambase	Camsoft	£45.00
Cardbox	Caxton	£54.00
Condor 1 Junior	Caxton	£90.00
Nucleus	Compact	£90.00
Delta 4.3	Compsoft	£90.00
DAC-Base	DAC	£45.00
Retrieve	Sage	£105.00
GBase	SPI	£90.00
SSI Data	SSI	£202.50
Tas Plus	TAS	£71.50
Flying Start	Mitra	£43.00

ENTERTAINMENT SOFTWARE

Alter Ego	Activision	£22.50
Borrowed Time	Activision	£18.00
Mind Shadow	Activision	£18.00
Music Studio	Activision	£22.50
Portal	Activision	£22.50
Shanghai	Activision	£18.00
Tass Times	Activision	£18.00
Alex Higgins Snooker	Amsoft	£18.00
Cyrus II Chess	Amsoft	£18.00
Mean 18 Golf	Amsoft	£18.00
Music Construction	Amsoft	£18.00
Pinball Construction	Amsoft	£18.00
Pitstop II	Amsoft	£18.00
Seven Cities of Gold	Amsoft	£18.00
Summer Games II	Amsoft	£18.00
Winter Games	Amsoft	£18.00
Archon	Ariolasoft	£18.00
Lode Runner	Broderbund	£28.00
Chessmaster 2000	Electronic Arts	£26.95
Grandslam Bridge	Electronic Arts	£17.95
Sargon 3 Chess	Hayden	£46.00
Mind Prober	Human Edge	£31.00
Ballyhoo	Infocom	£26.00
Deadline	Infocom	£21.00
Enchanter	Infocom	£21.00
Hitchhikers Guide to Galaxy	Infocom	£26.00
Leather Goddesses of Phobos	Infocom	£27.00
Moonmist	Infocom	£27.00
Planetfall	Infocom	£21.00
Seastalker	Infocom	£21.00
Sorceror	Infocom	£21.00
Zork I	Infocom	£27.00
Zork II	Infocom	£21.00
Conflict in Vietnam	Microprose	£22.50
Crusade in Europe	Microprose	£22.50
Decision in the Desert	Microprose	£22.50
F15 Strike Eagle	Microprose	£20.00
Hellcat Ace	Microprose	£16.00
Great Escape	Ocean	£18.00
Top Gun	Ocean	£18.00
Ultima III	Origin	£22.50
Destroyer	U.S. Gold	£22.50
Silent Service	Microprose	£22.50
Solo Flight	Microprose	£18.00
Spitfire Ace	Microprose	£16.00
Flight Simulator	Microsoft	£45.00
Flight Simulator/Jet Scenery Disk 3	Microsoft	£18.00
Flight Simulator/Jet Scenery Disks 1-6	Microsoft	£83.00
Super Sunday	Nexus	£20.65
AM/FM Trivia	PC Leisure	£9.00
Boulderdash	PC Leisure	£9.00
Boulderdash 2	PC Leisure	£9.00
Mind Dance	PC Leisure	£9.00
Jewels of Darkness	Rainbird	£18.00
Silicon Dreams	Rainbird	£18.00
Starglider	Rainbird	£18.00
Fortune Teller	Status S'ware	£13.50
Icon-Quest for The Ring	Status S'ware	£13.50
Jet	Sublogic	£43.00
Bruce Lee	US Gold	£18.00
Dambusters	US Gold	£18.00
Pac Man & Dig Dug	US Gold	£18.00
Strip Poker	US Gold	£18.00

GEM SOFTWARE

GEM Diary	Digi. Research	£36.00
GEM Draw	Digi. Research	£90.00
GEM Draw Business Library	Digi. Research	£36.00
GEM Font Editor	Digi. Research	£90.00
GEM Fonts & Drivers	Digi. Research	£36.00
GEM Graph	Digi. Research	£90.00
GEM Programmers Toolkit	Digi. Research	£162.00
GEM Word Chart	Digi. Research	£90.00
GEM Write	Digi. Research	£90.00

SPREADSHEETS

Supercalc 3	Amsoft	£63.00
Scratchpad Plus	Caxton	£54.00
Logistix	Grafox	£102.50
K Spread 2	Kuma	£72.00
PC Planner	Sage	£102.50
Words and Figures	Lifetree	£102.50

UTILITY SOFTWARE

Turbo Gameworks	Borland	£45.00
Turbo Lightning	Borland	£72.00
Turbo Pascal	Borland	£73.00
Turbo Pascal Graphic Toolbox	Borland	£51.00
Turbo Prolog	Borland	£72.00
The Knife-86	Hisoft	£27.00

WORD PROCESSORS

Mindreader Executive	Advance	£45.00
Wordstar 1512	Amsoft	£63.00
First Word War	GSI	£72.00
Word Junior	Microsoft	£55.00
PC Write	Sage	£105.00
Wordperfect Junior	SSI	£89.00
Wordperfect Personal	SSI	£179.00
Wordperfect Library	SSI	£153.00
Tasword PC	Tasman	£22.50
Wordperfect	Wordperfect C	£439.00
Volkswriter	Lifetree	£206.00

MISCELLANEOUS

Touch 'n Go typing tutor	Caxton	£22.50
Delta Graph graphics analysis	Compsoft	£63.00
Fleet St Editor elec. publishing	Mirrorsoft	£135.00
Complete Introduction audio cass & floppy	Realtime	£22.50
Summamouse	Summa	£110.00

WORD PROCESSOR/DATABASE/ SPREADSHEET PACKAGES

Information System	Pomex	£102.50
PC Four	Psion	£72.00
Open Access 1 Entry	SPI	£135.00

We also stock software for Spectrum, Commodore, Amstrad, QL and Acorn. Write or send for Price List.

Tel: (0924) 409753 for [Access] VISA AMERICAN EXPRESS

Government, Local Authority, Educational enquiries sought.
Special B.F.P.O. Rates.

ALL PRICES INCLUDE VAT AND CARRIAGE

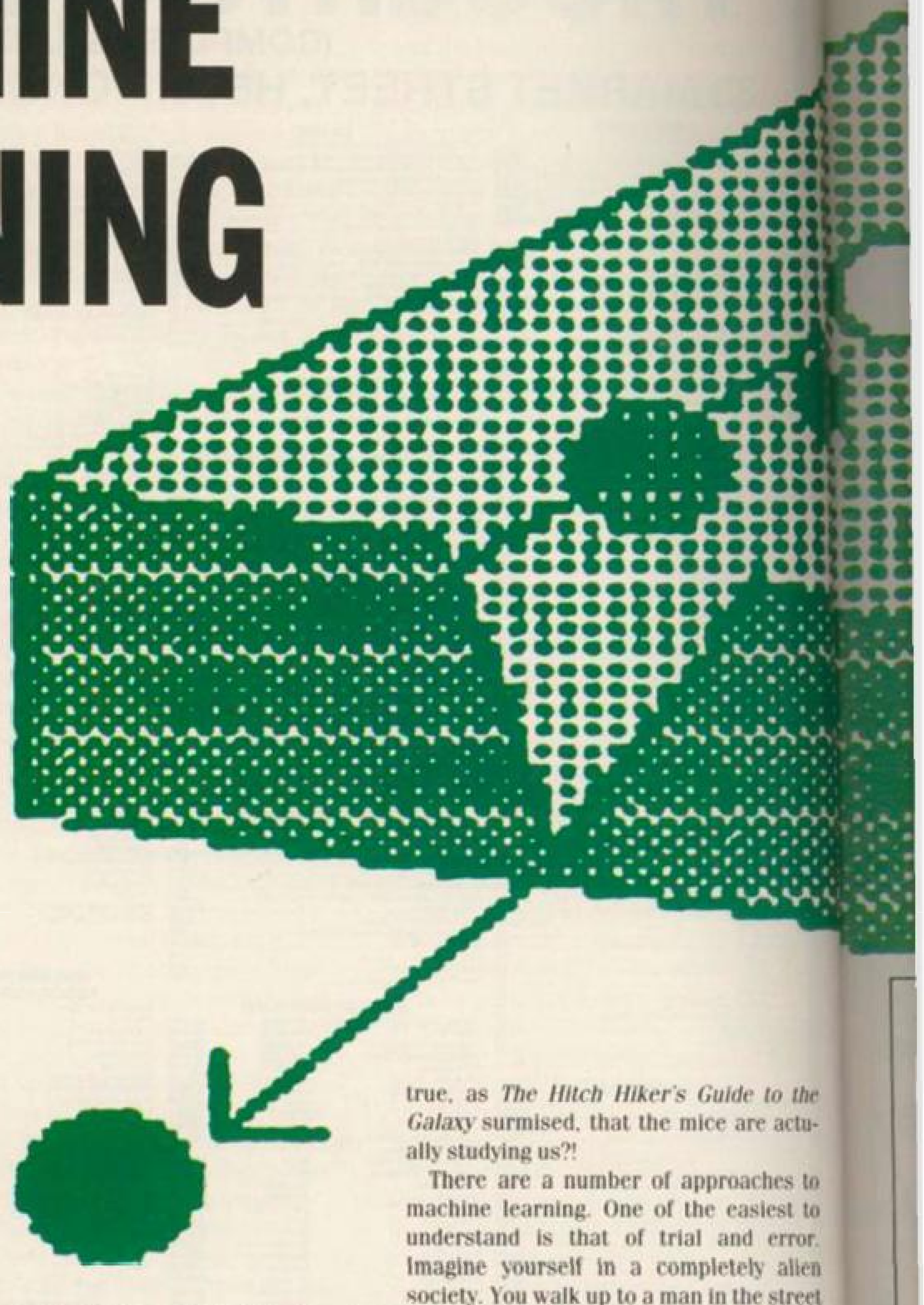
EXPORT ORDERS WELCOME ASK OR SEND FOR PRICE LIST

Tel: (0924) 402337 for General Enquiries.
Telex: 556577 CROSS G

Shop open 9-5pm Mon-Sat; Mail Order 9-8pm Mon-Sat.
You can phone up to 8pm and speak to a real voice.

MACHINE LEARNING

CREATING THE THINKING MACHINE IS THE AIM OF PROGRAMMERS WORKING IN ARTIFICIAL INTELLIGENCE. MARCUS JEFFREY EXPLAINS



Artificial Intelligence is a rather widespread subject with boundaries which tend to be difficult to define. Despite this, there are a few areas which are undoubtedly still within the realms of the thinking machine. One such is that of Machine Learning, which we are going to take a brief look at in this article.

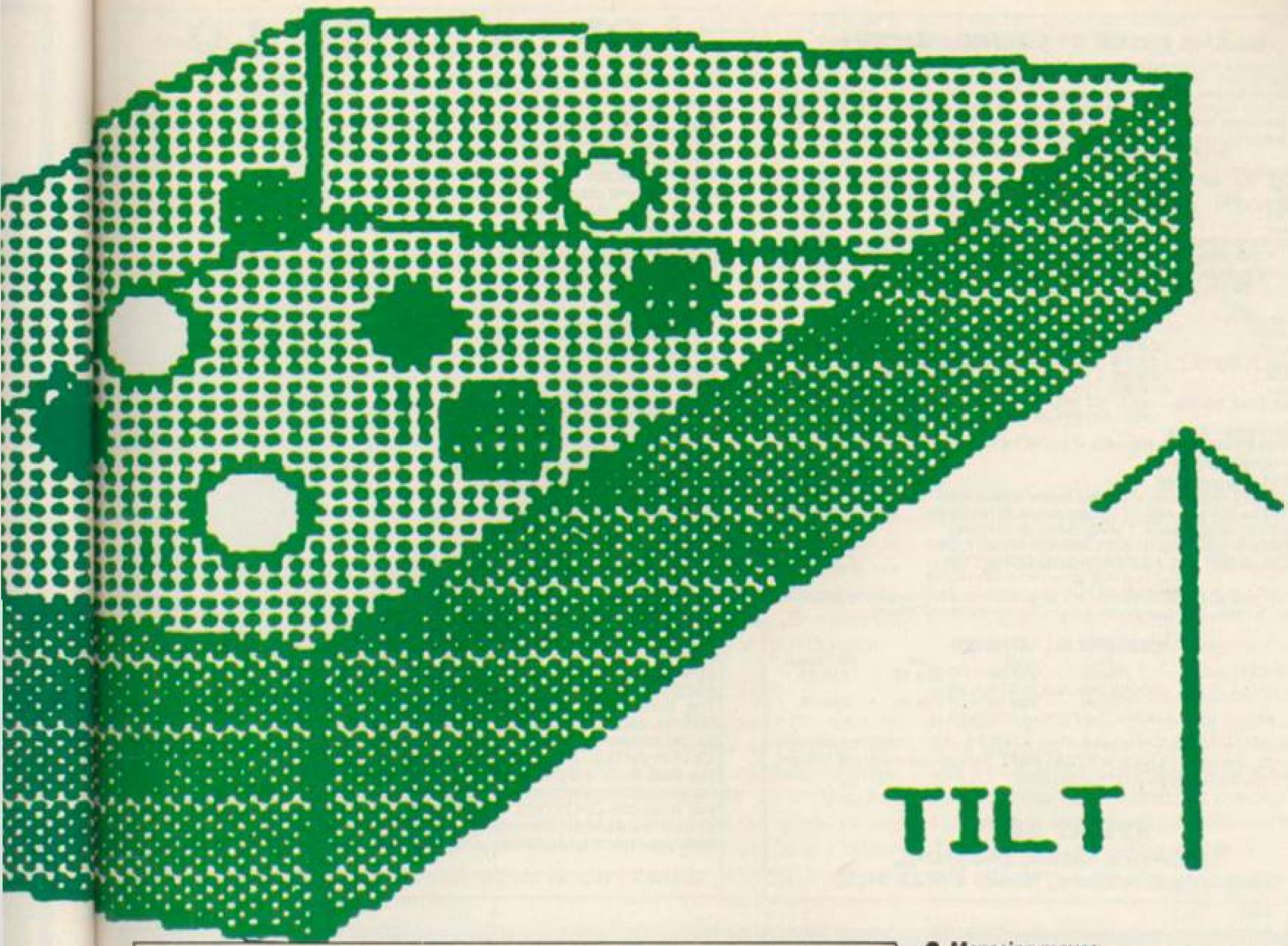
If you were to ask people to define the term Artificial Intelligence, you would almost certainly get a different answer from each person you spoke to. Originally, Artificial Intelligence was defined as any machine action which, if performed by a human, would be said to require intelligence. Unfortunately, this definition was never particularly satisfactory. For example, at the turn of the century, simple mathematics would have been said to require intelligence, however, computers and even hand-held calculators can easily perform these operations, and they certainly do not fall into the categories of artificial intelligence as it is known today.

I could go on, citing examples of spreadsheets, accounts packages, simulat^rs, chess, computer vision, and so on. Only the last few of these would be considered to fall into the field of artificial intelligence and even these may have a limited life. For instance, if a new technique were developed which allowed the computer to play a perfect game of chess based on a few simple algorithms, then suddenly the game would lose its status and would no longer be considered as an artificial intelligence problem.

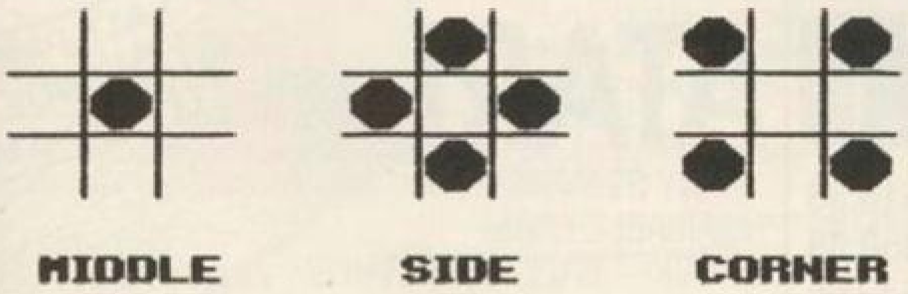
One of the areas which few people would deny lies solely within the bounds of artificial intelligence is that of machine learning. Humans develop and learn from experience, and teaching a computer to use this process must surely embody the concept of the 'thinking' machine. This is, to some extent, emulating the laboratory rat experiments, where tests of intelligence and behaviour were performed by sending mice through mazes. Would they learn from their earlier mistakes, to find the correct way through the maze? Or is it true, as *The Hitch Hiker's Guide to the Galaxy* surmised, that the mice are actually studying us?!

There are a number of approaches to machine learning. One of the easiest to understand is that of trial and error. Imagine yourself in a completely alien society. You walk up to a man in the street and say "Hello", only to find yourself flat on your back, having been punched in the face! Not a very pleasant fellow, was he? Unfortunately, exactly the same procedure is repeated with two other men, who you approach in the same manner. By now, you are probably very sore, have a couple of black eyes, and will be very reluctant to repeat the procedure. You have just gone through a process of learning by trial and error.

Continuing the learning process, you might try approaching women rather than men, or you may try something other than the word "Hello", which may be taboo in such a strange society. Thus, the learning process would continue. If for instance, after your first three abortive attempts at communication, you continued to repeat the process, and the next eight men you spoke to were very amenable, then you may change your original hypothesis, cal-



● Menacing moves teach a computer to play.



● There are only three possible opening moves in the game of noughts and crosses.

ling the first three attempts unfortunate coincidences.

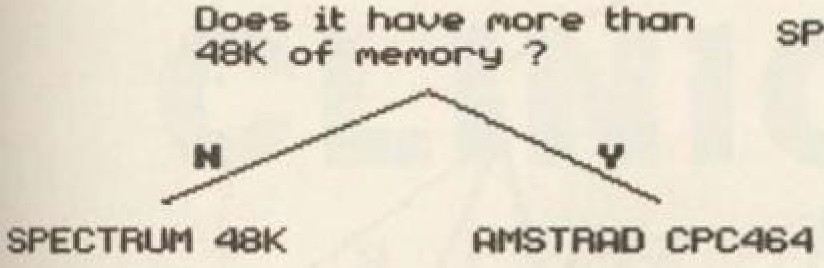
This learning process can be conceptualised in the form of a stimulus model. Starting with a list of all possible actions (in this case opening lines), each would have assigned to it a probability of success. When you are first in the alien environment, these probabilities may all be the same, or they might be modified if you decide to try to apply what you know of your own environment. On first meeting somebody, you would try one of the opening lines, either randomly or the one with the highest probability. You would then increase or decrease the probability associated with the action based upon their response. If they punch you, the probability of a favourable response would decrease. Alternatively, if they turned around, smiled, gave you a meal and a house, and generally heaped riches upon you, then you would almost certainly increase the probability of success for the action which led to this favourable result.

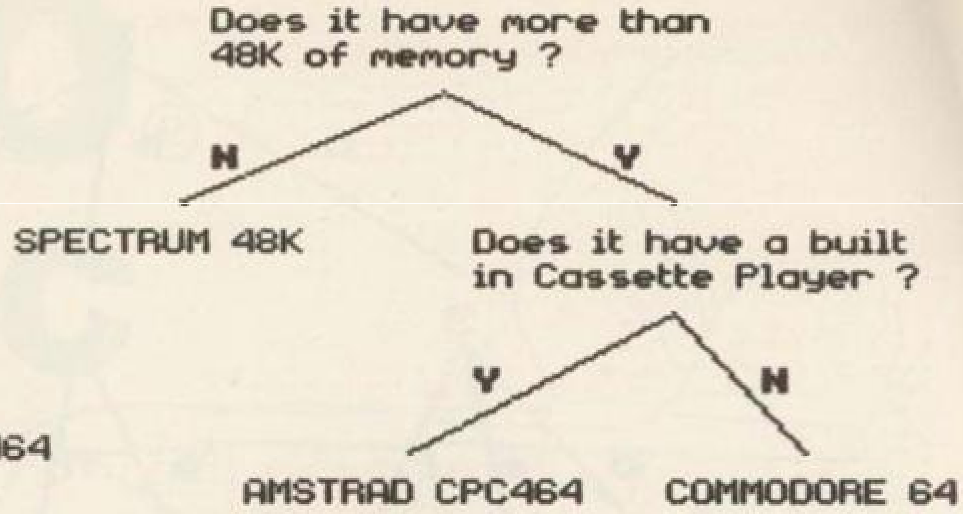
Matchbox

Machine learning of this sort is not entirely restricted to computers. In fact one of the earliest experiments was in the form of a matchbox model, called *Menace* (Matchbox Educable Noughts And Crosses Engine), which was designed to play the game of noughts-and-crosses. Now, there are plenty of programs around which can play this game perfectly, but the point of this exercise was to let the machine start by playing random moves and learn from experience how to play the game better. The model was constructed by assigning a different matchbox to every board position. These matchboxes had variously coloured beads in them and a V-shaped slot cut in the front, such that when the matchbox was tilted forward, one of the beads was selected by chance, by being the first to roll through the slot. This arrangement is shown in Figure One.

When it was time for Menace to make a move, the matchbox corresponding to the present position would be shaken then tilted to select a coloured bead at random. There were nine colours, one for each square, and boxes only contained beads corresponding to legal moves. In addition, symmetry was used to reduce the number of beads. For instance, the box for the first move (Menace always moved first) contained only three beads, corresponding to the centre, side and corner (Figure Two). As the game progressed, Menace would make random moves, based upon whichever bead happened to roll through the slot. At the end of the game, stimulus is ▶

● Tree diagrams are important in artificial intelligence.





● By asking these questions a computer can learn to identify objects.

applied. If Menace lost, then a bead of the appropriate colour is removed from each of the used boxes, making it less likely that Menace will play the same move in a future game. Similarly, if Menace won (or drew, if playing an expert), then a bead of the appropriate colour is added to each of the used boxes, encouraging Menace to play a similar move in the future.

This approach, which essentially has the computer mimicking human behaviour, is not necessarily the best. Though the human brain is well beyond the best computer in terms of memory organisation and processing, we do still have a number of drawbacks. One of these is our tendency to forget things. We seem to store information in a variety of unusual ways, and the "trigger" to, say, recall a name cannot always be found just when we need it. I am sure you have come across the situation where you recognise a face, but cannot remember the name. Barring a complete failure of main and backup storage, computers never forget anything unless they are told to. Consequently, much more efficient knowledge building techniques can be used.

Questions

A very simple game, which most of us have played at one time or another is Twenty Questions. One person thinks of an object, and a second tries to guess the object by asking no more than twenty simple questions. This game is often started with the question "Is it animal, vegetable, or mineral?", though officially all the questions should be of a form such that they require a yes or no answer. If you were to listen to people playing the game, you would no doubt find many different methods used. For example, some people have a collection of "useful" questions which will quickly narrow down the search. However, the majority of people lack the ability for totally logical thought, and many of the questions they ask will be of little or no help. A computer can be taught differently.

For the purposes of demonstrating how the computer can work, we will limit ourselves to just a subset of items to choose from; that of computers. The computer is starting with absolutely no knowledge of the subject area. To give it a chance, we will give it the name of one computer which we might think of, such as the Spectrum 48K. Now we are ready to start the game.

Knowledge

Let's begin by thinking of the Amstrad CPC464. The computer will use the only knowledge it has, and ask if we are thinking of the Spectrum 48K. We tell the computer that this is not the micro we are thinking of. Lacking any further knowledge, the computer is forced to give up. However, before starting the next game, it asks us three questions:

Q: What micro were you thinking about?
A: Amstrad CPC464
Q: What would be a good question which would distinguish between the Spectrum 48K and the Amstrad CPC464?
A: Does it have more than 48K of memory?
Q: In the case of the Amstrad CPC464, the answer would be?
A: Yes

Having entered this question and answer session into memory, the computer can now ask a further question in its search for the correct micro. The computer has effectively built the tree shown in Figure 3.

Memory

We can now think of another computer, say the Commodore 64. The computer will first of all ask whether the micro we are thinking of has more than 48K of memory, to which we answer 'Yes'. It therefore asks if we are thinking of the Amstrad CPC464, to which we must answer 'No'. Having reached the bottom of the tree, the computer is forced to give up, but it again asks the two questions. This time our answers might be:

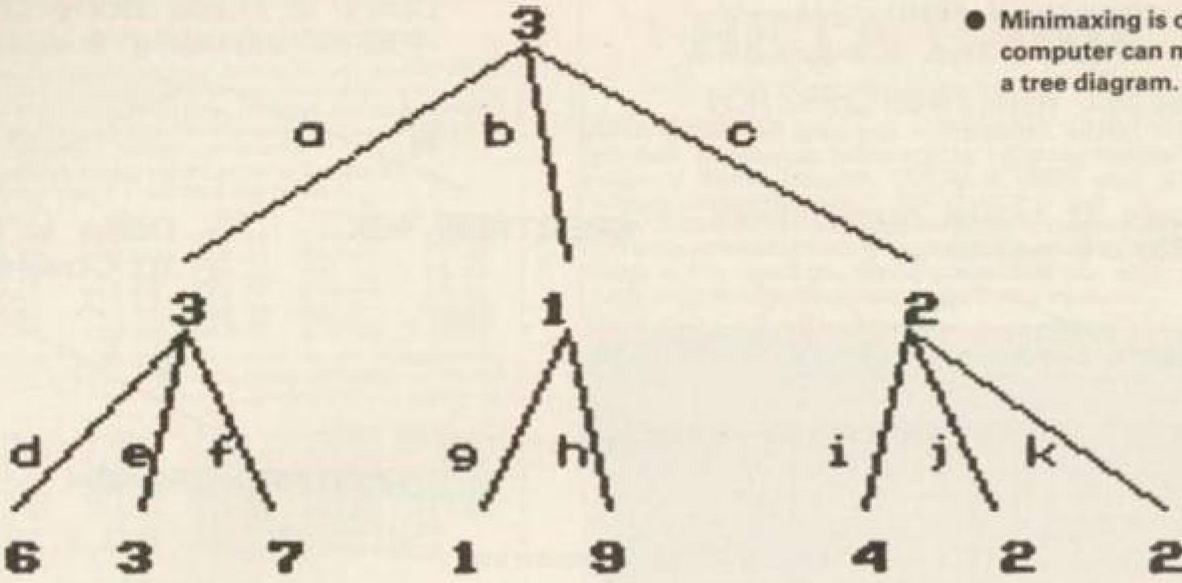
Commodore 64
Does it have a built-in cassette player?
No

The computer adds this to its tree, which now looks like Figure Four, and continues with the next micro. It is fairly obvious that, as this continues, the computer builds up more and more information. This is an example of rote learning.

A different method of rote learning was used very effectively by A. L. Samuel in his draughts (checkers) playing program. This program used a look-ahead tree followed by an evaluation function. So, for instance, with a look-ahead of only two-ply (it would normally be more than this), the computer would test all of its own moves, followed by all the opponent's possible replies.

At this level, it would then evaluate the position using a number of factors, such as the number of pieces, their positions and so on. It would store these evaluations, and assign the numbers to the bottom level nodes of the tree. The computer is trying to maximise these evaluations, and the opponent is trying to minimise them. Therefore, at the second level, the lowest score from the subtrees at the bottom level is taken. Finally, again trying to maximise these scores, the computer looks for the highest score at the second level and makes this move.

If this process seems a bit complex, look at the diagram in Figure 5. The numbers at the bottom are the evaluations of the position at a depth of two-ply, where the computer is trying to attain the highest possible score. Ideally, this would be the node labelled '9'. However, since the opponent would be trying to minimise the computer's score, he would not play a move to the node labelled '9', but would instead choose the one labelled '1'. This lowest figure is placed at the node on the second level, and the other second level nodes are treated similarly. Now, the computer has a choice between three nodes where, after the opponent's move (assuming the opponent plays as expected), the value of the position will be '3', '1' or '2' respectively. Obviously, in this case, the computer would play move 'a' leading to the node ▶



● Minimaxing is one way the computer can move through a tree diagram.

with the highest value. This operation is known as 'Minimaxing' and is frequently used in trees of this sort.

The problem with this tree-building method is the time it takes to search the tree. If we assume an average of ten moves from any position, then a search of just two-ply will require evaluating 10 × 10 × 10, or 100, positions. Searching to a depth of six-ply would require searching a million positions (ie. 1000000). Samuel's program improved upon this by storing its evaluations. So, for the position in Figure Five, it would store the board for the top node, and assign it the value '3'. Now, when searching to a depth of two-ply, rather than immediately evaluating the position, it would search through its list of stored positions. If it found a match, then it would use the evaluation already stored. Thus, it has effectively searched to a depth of four-ply. Now, by storing the position yet again, if during anouther game it matches it to a two-ply search, it will have an evaluation to a depth of six-ply, and so on. The only draw-back with this method is the intensive use of memory to store all the positions. Therefore, only the most frequently used postions were stored, and housekeeping routines were written to keep the number of stored positions reasonably low.

Evaluation

In addition to this method of learning, Samuel's program also learnt from its own play. The evaluation function was based on a number of distinct features such as the number of pieces, centre control, threat of fork, and so on. Each of these had a weight assigned to it, such that the more important features had higher weights. The eventual evaluation was of the form:

S = w1*s1 + w2*s2 + . . . + wn*sn

Now, if we could search the entire game tree to the end of the game, we could assign scores of '1' for a win '0' for a draw and '−1' for a loss. Unfortunately, this isn't the case, and the evaluation function is designed to give an indication of what we would find if we could search further. The problem which now arises is how to choose these weights. The answer is to let the program amend them through experience. This is similar to the Menace matchbox model, but far more sophisticated.

The program increases or decreases its weights for various features based on the difference between the minimaxed score ('3' in the above example) for the current position, and the evaluation score for the current position, which will have been worked out at a previous level. If the evaluation function were perfect, then these two numbers whould be the same throughout the game. Working in this way, the program can be set to play itself. Not only will it increase its stored library knowledge, but it will also tune its own evaluations, based on experience.

Expert systems

Eventually, Samuel's Checkers program had "remembered" all the worthwhile board positions, and had tuned its 40-odd factor evaluation function to play at close to championship level.

Up to this point, we have been studying game-orientated topics, and you may be wondering whether all this research is ever going to achieve anything. Game-playing is a very important aspect of artificial intelligence, provided an enclosed environment in which to test the programs. However, machine learning is now being used for practical applications at the forefront of technology.

You have probably heard the jargon phrase 'Expert Systems' mentioned during recent years. An expert system is essentially an intelligent database. It has lots of data and a set of rules which operate on the data. In its simplest form, the expert system can be viewed as a series of IF . . THEN statements. For instance, if you had an expert system to diagnose faults with your computer (not very useful if the expert system is based on the computer!) it might ask the following questions:

"Is the Power light on (Y/N)?"
"Is the computer plugged in (Y/N)?"
"Is the power switch on (Y/N)?"
"Is the computer connected to the TV (Y/N)?"

Based on the answers to these, it would try to diagnose what is wrong with the computer, and if it was unable to find the fault, would suggest that you return the computer to the dealer.

Rule induction

The problem with expert systems is the knowledge acquisition stage. In other words, the difficulties involved in entering information into an expert system database in a logical form. For instance, let us assume that we are trying to develop an expert system which will help you to choose the best game programs available for your computer. Now, this is quite a subjective decision. Do you like games to be fast, do you want graphics, adventures, shoot 'em ups or intellectual challenges? Trying to present all this knowledge to a computer could be quite a headache. Instead, a number of currently available expert systems learn from experience. Given basic knowledge on a subject, they form their own set of production rules to handle the database. They then test themselves by trying to pick out games which you would like. If they make a mistake, and choose a program which you did not like, then it will require a modification of the system. The computer will explain its reasons for choosing the game, and you will tell it why it was wrong. Based upon this updated information, the computer will modify its rules, and consequently improve its experience in the field of choosing games.

These rule-induction based expert systems are becoming increasingly popular. This is not only because they do not require explicit knowledge to be programmed, but also because they often tend to organise knowledge in a far more efficient, and often revolutionary way. They are beginning to reach the stage where they can do things better than the human expert.

MICRO® CLINIC

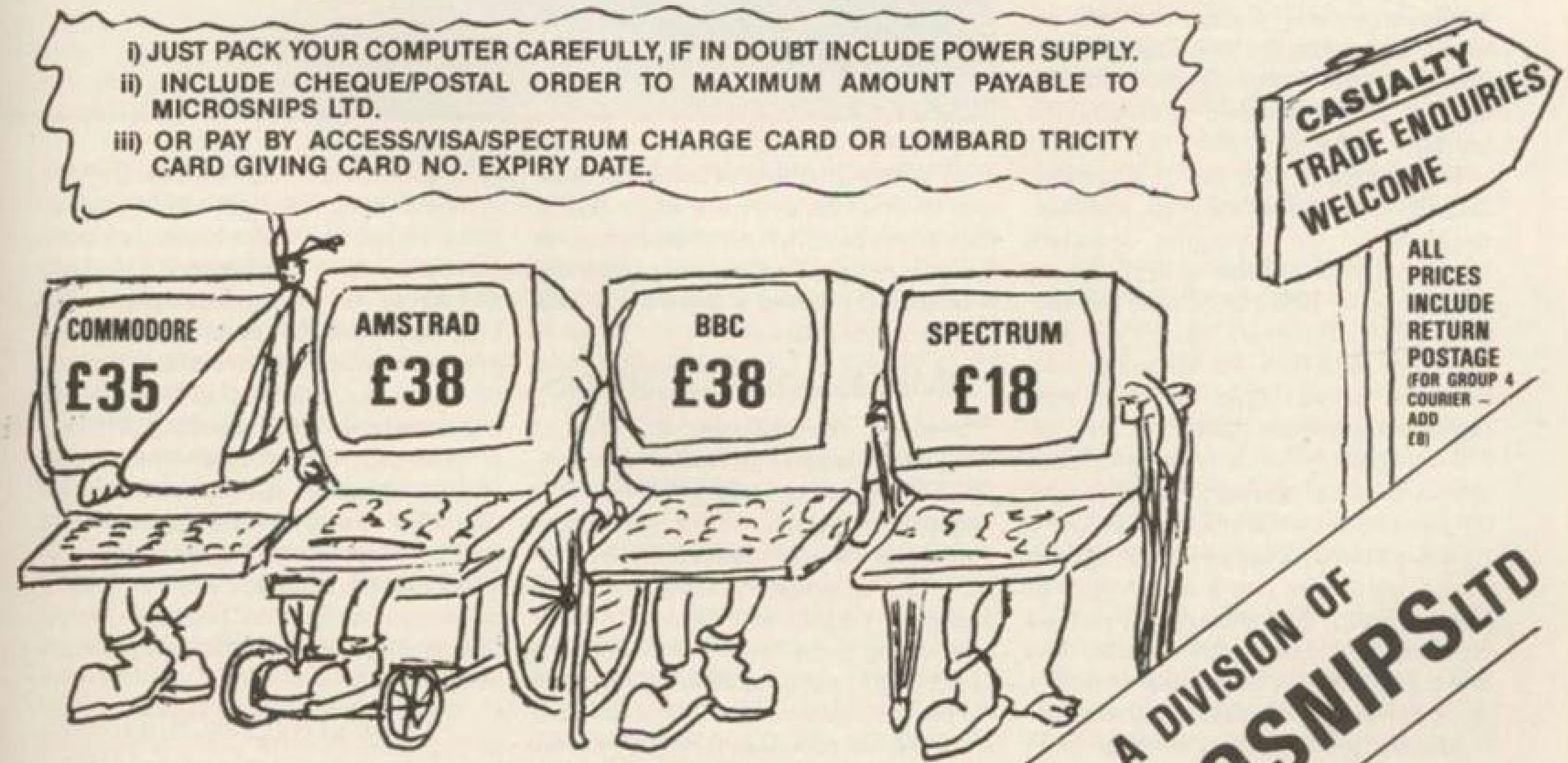


PO BOX 19
WALLASEY
MERSEYSIDE
L45 4FB

PHONE:
051-630 3013

WHY ARE WE DIFFERENT TO MOST OF OUR COMPETITORS?

i The whole computer guaranteed for 4 months!
ii Every computer fully soak tested before return!
iii All leading makes of computer repaired!
iv We don't say 24-hour service and then take 3-4 weeks!
v Providing parts available we guarantee 7-day turn-round!



PRICES SHOWN ABOVE ARE GUARANTEED MAXIMUMS – SUBJECT TO NO TAMPERING!

VISA

TRANSPUTER TRIAL

ADAM DENNING TRIES OUT THE ONLY TRANSPUTER DEVELOPMENT SYSTEM AVAILABLE FOR ANY HOME COMPUTER



The Kuma K-Max is a transputer development system for the Atari ST. The hardware is supplied in a small box with a short ribbon cable which plugs into the side of the ST, and the software is supplied on a normal ST-format 3.5" disk. The transputer box can house either one or two transputers, depending upon the configuration you desire. The box we examined contained one transputer – obviously the cheaper option, but the upgrade path is followed by sending the unit back to Kuma.

The transputer and the ST communicate via a fast serial link chip, specially-designed by the transputer designers Inmos, which is capable of data transfer at rates up to 20Mb (20M bits) per second. This is extremely fast for a microcomputer serial port. The transputer units used are Inmos T414s, which is best described as the standard transputer.

A transputer is a microprocessor whose mode of operation is somewhat different from normal microprocessors – Inmos is bound to say fundamentally different, but others see it as a matter of degree. Firstly, the transputer is designed for *parallel processing;* running more than one computation at the same time. This is done by having more than one transputer in your transputer system, although most of the software written for transputers is effectively ignorant of the number of transputers available and will in fact run happily in a pseudo-parallel fashion on one-transputer systems such as the one we examined. The only obvious difference is that attempts at parallel processing on one transputer are rather slower than when executed on multi-transputer systems, as genuine parallel processing is unable to proceed if there's only one chip to do the hard work.

SIMPLE INSTRUCTIONS

Secondly, the transputer is a form of RISC chip, standing for Reduced Instruction Set Computer. RISC is the currently fashionable method of microprocessor design. Its followers believe that by concentrating on simplicity of design, greater speed can be achieved. Obviously this is true so long as the majority of instructions performed in a computation are relatively simple instructions. A RISC chip has a small instruction set containing only a few instructions, while chips not following the RISC school of thought contain a wide variety of built-in instructions to perform even the most obscure functions. Here is not the place to say whether one method actually is better than the other, but the RISC concept is certainly catching on.

By providing the right set of instructions, a RISC chip may carry out any computation by combining suitable sequences of simple instructions. For example, an 8086 assembly language programmer is likely to perform division by using one of that chip's two divide instructions; a 6502 assembly language programmer, on the other hand, would write (or steal from a book!) a division algorithm using shifts, rotates and mathematical operations. This does not imply that the 6502 is a RISC chip but it does demonstrate that complex computations may be performed with simple instructions.

FLOATING POINT

As a parallel-processing RISC chip, the transputer's main boast obviously is its speed. It is said that the latest transputer, one which incorporates a floating-point arithmetic unit on the chip (not the unit supplied in the K-Max), is as fast as a DEC





Vax 8650 supermini.

The transputer clearly is a scientific curiosity, one which most programmers, engineers and dabblers would like to get their hands on. Kuma's little plastic box provides a relatively cheap way, as long as you already own an Atari ST. There are some drawbacks, though.

The first problem can be overcome simply by spending more money: a transputer development system really needs more than one transputer unit to be useful. The second problem is a little more serious, though. To take advantage of parallel processing such that the applications being processed are unaware of how many transputers are present, Inmos recommends programming in their own specially-designed high-level language, Occam. They enforce this point strongly, saying that the assembly language used by the chip is liable to change without notice and that the Occam compiler produces code as good as hand-compiled code. All the transputer applications and programs printed anywhere are going to be in Occam or in some other high-level language such as C for which Inmos has written a compiler. The C compiler produces Occam, too. The message from Inmos, in large flashing lights, is that if you intend to develop applications for the transputer, stay away from assembly language programming. Any large user of the chip is going to follow this rule so learning the assembly language of the chip may provide intellectual stimulation, but it does not provide the information one really requires for development.

As yet an Occam compiler is not available, although Kuma plans to release a number of high-level language products including Occam and C in the near future. When these appear the programmer will be able to use the K-Max with much greater confidence.

ASSEMBLY LANGUAGE

This is not to say that the K-Max is useless, as there is something to be gained from learning about the chip's memory map and its basic workings. The over-riding factor though is that data on the assembly language accepted by the transputer is very hard to come by. There is a little information provided in the K-Max manual but programmers interested in this system are sure to want more.

The software supplied with the system consists of an assembler, debugger and editor combined in the usual Kuma manner. Since this is the only transputer assembler we have ever seen it is impossible to make meaningful comparisons with rivals. Certainly it does its job of assembling source code into object code with commendable speed. The editor is a combination line-editor and screen editor, one keypress taking you between the two. The screen editor limits you to movements through the text, deletions and insertions. All the more advanced editor features, such as search and replace, are performed only from the line editor. The package would certainly be enhanced by a more friendly and more powerful (Gem-based, perhaps?) editor but programmers seem able to cope with most text-entry methods.

The debugger is a useful tool. It allows you to examine and alter transputer memory, disassemble transputer assembly language, run programs and fill memory with given bytes. It does not allow single-stepping, though.

Some example source files are provided on the distribution disk, including the inevitable Sieve of Erastothenes prime number program. The sieve is written using a 'virtual' algorithm, allowing it to calculate prime numbers far greater than the normal sieve program using real memory. Certainly this program runs fast, but the examples aren't exactly exciting. A graphics demonstration would be nice, for example. The problem is of course that the transputer in the K-Max is not implemented as a co-processor for the Atari's own 68000 processor, so it is unable to provide what we all want – a faster, more powerful ST. This may well prove to limit its appeal in commercial terms.

The documentation supplied with the unit is rather cheaply produced, complete with irritating lapses in spelling and grammar. It covers the basics of transputer operation, fast serial link operation and general transputer assembly-language programming, and it also describes the use of the editors, assembler and debugger. it seems to repeat itself often and undoubtedly could hold more information.

In summary, the K-Max is potentially very educational although many users may find it rather daunting. With a better manual it could be useful to some determined hackers, but inevitably the lack of Occam hinders its usefulness, especially as it cannot be used to enhance the Atari ST's own operation. Buy it if you fancy yourself in the role of white-coated mad scientist, otherwise you might be better advised to save up for an 80386 machine.

MUSIC MAESTRO

GETTING STEREO SOUND FROM THE CPC HAS BEEN DIFFICULT. WE TESTED A UNIT WHICH MADE IT EASY

When the Amstrad was launched over two years ago it had a number of advantages over its rivals, one of which was the ability to create stereo sound. This is achieved by the use of the programmable sound generator chip from General Instruments designated AY-3-8912. This chip has 15 registers compared with the eight found on the CPU so, as you can imagine, it is a fairly complex piece of equipment.





● **Above: All kinds of music and sound effects will sound better with the Maestro.**

The Amstrad has only one speaker driven by an internal amplifier, which is not much use for stereo sound, but on the back it has a stereo output jack socket . . . great. I wonder how many people plugged their stereo headphones or speakers into this socket expecting to hear their favourite beeps, bops and bangs in super stereo and heard absolutely nothing? The internal amp drives only the internal speaker, so you need to buy a separate amplifier and a pair of speakers or headphones, or attempt to utilise a Hi-Fi unit.

Amstrad sells an amplifier/speech synthesiser to complement the computer, but there are other systems on the market notably the Maestro from Vanguard Leisure. The Maestro unit arrived in a large polystyrene box, together with a pair of high quality 30w double cone air suspension speakers, a pair of miniature headphones and a demo tape. Setting up the equipment is easy and straightforward. You just plug the power lead from the monitor into the amp, link the power lead from the amp into the computer, plug the stereo output lead into the jack socket and finally connect the speaker leads to the amp and away you go.

The leads are just long enough for you to position the amp away from the computer, but the speaker leads are long enough for you to set them up where you want. The amplifier is well made, both inside and out, and contains both left and right volume controls, a headphone jack socket and a switch to change from speakers to headphones. The speakers themselves are typical of the good quality car stereo type and can be mounted at any attitude with the brackets supplied. As they are of the duel cone type, they give you an excellent response over the full frequency range.

The sound quality from the Maestro is first class, though it is dependent upon the sound being generated by the computer – the demo tape gives you quite a few examples of what you can expect. The difference good sound can make to a game is amazing. Take, for instance, *Sorcery* from Virgin or *Defend or Die* from Alligata. These games may be old, but they are much improved by a system such as the Maestro.

For the more seriously minded, there are a number of utility programs on the market which allow you to create tunes, sound effects and so on. For these users, something as good as the Maestro is probably a must.

At £39.95 the Maestro is not cheap, but given the quality of the speakers, the addition of headphones and the overall finish and presentation, it has to be good value for money.

It is worth noting that Vanguard Leisure is marketing a number of tapes/disks of dedicated music called Easy Listening. At present there are four tapes and two disks available containing such diverse offerings as Bach's Toccata and Fugue in Dm to Another one Bites the Dust from Queen. The scores are well written and pleasing to listen to, while the screen display incidental graphics. The tapes cost £6.50 and the disks £14.50.

Vanguard Leisure Ltd, Church Row Chambers, Franklands, Longton, Preston PR4 5PD.

DATA SOLVED

WITH THE AID OF INGENIOUS ADD-ONS THE DISABLED CAN COMMUNICATE THROUGH COMPUTERS. CAROL ATACK INVESTIGATES

Computers can bring a host of benefits to our lives. They ease communications and help us to deal with information quickly and efficiently but their usefulness to able-bodied people is slight compared to the advantages a computer can give to people with certain disabilities.

To highlight those possibilities, Datasolve, a Thorn-EMI company based at Sunbury-on-Thames, has launched the Datasolve Award for Technological Innovation to Aid Cerebral Palsy Children. Cerebral palsy is a disability caused by damage to the brain at birth. Sufferers are unable to control muscle movements and have great and frustrating difficulties in communication.

AWARENESS

Margaret Fawcett, Datasolve group marketing manager, explained how the company became involved with raising awareness of the problems of cerebral palsy children.

"Datasolve inaugurated a charity ball for the computer industry last year and it was decided to nominate a different charity to benefit each year. Last year we raised more than £40,000 for the Association for Spina Bifida and Hydrocephalus children, through the ball and other fund-raising events. This year the charity we chose was the Spastics Society, which works for people with cerebral palsy. We had decided to look for a charity appropriate to our industry, so that we could do more than raise money.

"The Spastics Society seemed best as there are strong links between the Society and the computer industry already. People with cerebral palsy usually have full control of one muscle group and through that they can control a keyboard. The Spastics Society already has a microcomputer officer who co-ordinates work in this area.

"Many people who are related to or know someone with cerebral palsy have used their computing knowledge to facilitate that person's use of a keyboard; as the disability is specific to the individual, each case tends to require an individual solution so that they can sit at a computer and work, though some inventions have helped many people."



● A pupil from Thomas Dealrue School, Kent, learning to paint with the Photonic Wand.

The award scheme was begun by a group of Datasolve employees who saw that there was an opportunity to provide a great deal of help and raise awareness of the usefulness of computers to people with cerebral palsy.

"We began the award scheme to encourage a range of people, particularly hobbyists who may not have thought of these problems previously, to think of what can be done to help the handicapped. We wanted them to develop gadgets which would be of use to a child. We want to increase awareness."

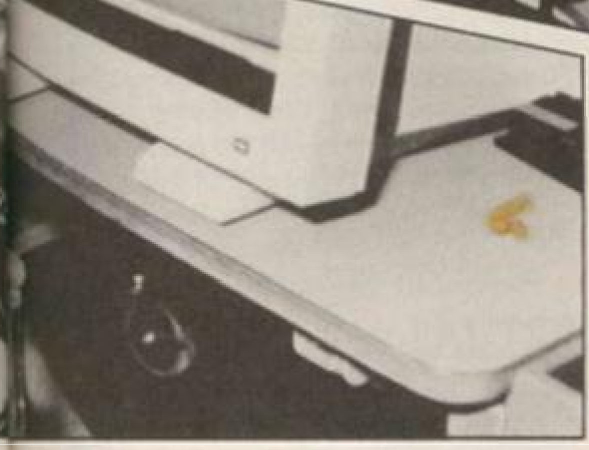
After a launch of the award scheme, there were a great many enquiries from home enthusiasts and small-scale manufacturers. Twenty-five entries were received, varying in the amounts of technology involved in their operation. Some were simple ideas, for example a device to help wheelchair users to position themselves in from of computer. Another entry was a double-sized keyboard to fit over the existing one which would enable a child with reasonable control of the hands to get to grips with the increased hit area and be much less frustrating than a standard-sized keyboard.

Two of the entries are already in production and proving their usefulness to children in schools and at home. The 4-Way Games Joystick was invented by Tony Cartwright of Interface Designs at Guildford. It is a simple idea to help children with cerebral palsy play computer games which require a joystick with their able-bodied contemporaries. It drives all standard games software on the BBC series machines, except for the few which demand a true analogue joystick.

The 4-Way Games Joystick differs from standard models in its rugged and stable construction. A large stick movement helps those with limited control over limb movement to move in the proper direc-



● A pupil from Charlton Park School, London, preparing to use the 4-way Games Joystick.



tions. A single fire button is built into the top of the stick but those who cannot manipulate it are helped by an automatic fire facility brought into action by a switch at the base of the joystick. A specially-designed gate gives the joystick a fast but positive movement.

INDEPENDENCE

Cartwright believes that technology has a great deal to offer cerebral palsy children and would like to see more work being done to help them lead independent lives. "It is vital to understand the psychological importance to a disabled child of being able to play exactly the same games as a brother or sister and not being excluded on the basis of handicap," he says.

The joystick is already available from Interface Designs at a cost of £60.40. The company can be contacted on 0483 32909.

The second of the designs already in production is the Photonic Wand. It is an optical sensor, a long-distance version of a lightpen, and permits a child to use a computer by head movement alone. The wand, which plugs into the analogue socket of a computer, is attached to a plastic helmet or to spectacles and acts like a pointer moving the cursor round the screen as the child's head is moved.

The wand can help children with severe involuntary head movements, as the closer they sit to the screen the greater the movement necessary to move the cursor. Users with very limited movement can adjust the system so that it responds to very small head movements.

The wand will work up to a distance of two metres from the screen and although it can detect light from the screen at that distance it is unaffected by daylight or lighting.

The flexibility of the wand allows it to be used by many people and it can be used with a variety of programs depending on the needs of the user. Young children can use it to select single letters or whole words, play computer music or paint a coloured picture.

Older and more proficient users can, with the addition of keyboard emulation software, run commercial programs without modification, including word processing programs. That is done through the use of special alphabetic displays on the screen which enable the user to select commands or letters. The wand is sold for approximately £100 and details can be obtained from the Photonic Wand Co on 0244 300002.

These commercially-exploitable inventions are examples of what Datasolve has been seeking in competition entries. They negate the effects of a severe handicap and help the user to work or play with a computer in the same way as anyone else. Should any entries be suitable for development and production, Datasolve will help entrants find a suitable manufacturer and provide marketing advice, and do everything possible to get the product on the market. Fawcett says:

"There are obvious benefits to the company in sponsoring this type of competition, as Datasolve is involved in the education sector of the computer market and it ties with that. We should try to promote a social conscience. There is a great deal of expertise among the public relating to computers and we are trying to tap that. We must harness the enthusiasm of hobbyists and the ideas on which they are working should be taken up by industry. We hope this initiative will have a lasting effect."

Another important point is the relationship between the computer industry and people with cerebral palsy. Using a computer is a good way for a disabled person to gain employment on equal terms to able-bodied people. In the past there have been few real jobs for the severely disabled and technology should open the opportunities which previously have been denied them.

With wider interest and more input from the computer industry and experts at home, more disabled people can be helped to work and enjoy a hobby which does not discriminate against them because of their communication difficulties.

The entries are being judged by a panel of experts, including representatives from the Spastics Society. They will all be on display to the industry at its charity ball at the Hilton Hotel, London on June 11. The Duchess of Kent, the patron of the Spastics Society, will attend.

The winner will be presented with a Thorn-EMI Liberator, a laptop model which Datasolve believes would be useful to anyone with an interest in computing. Although this competition is a one-off, next year's charity should receive similar innovative support.

THE 1987 ATARI SHOW MERITED A VISIT FROM JACK TRAMIEL. OUR REPORTERS WERE ALSO THERE

SHOWING OUT

Atari naturally enough chose the Atari Show, held in London from April 24-26, to launch their numerous new models in the UK market. Delivery and prices for the two versions of the PC, the Atari SLM laser printer and the Mega ST were announced by the National Sales manager.

The entry level Atari PC will be available in June. The 512K computer will support EGA and CGA graphics modes without the need for add-on cards and will cost £399.95 without a monitor or £499.95 with. The system features an 8088 microprocessor with a switchable clock speed of 4.77Mhz or 8Mhz. It is expandable to 640K plus 640K screen RAM. Sockets are provided for an 8087 maths co-processor, and there is a parallel printer interface and an RS232C port for modems and other serial devices.

AVAILABILITY

A single floppy disk drive is standard, though there is the option of fitting a second one, and a mouse is also provided.

The expandable system will be ready in July. With a twin floppy drive it will cost £599.95 and with a 20Mbyte hard disk drive the price goes up to £999.95. In addition to the features it shares with the entry level model five expansion slots to house industry standard expansion cards are included.

Jack Tramiel, Atari's Chairman explained the decision to move into this part of the market; "We aim to cover the total spectrum of business and we are now fully equipped to do this. People want an IBM clone because it's what they have in their office. If they want to buy them we are going to make them. It's not something I'm very proud of."

Perhaps the mnost exciting of the new products was the laser printer for the Mega ST. It will be available from June as will details of its price which, it seems, is yet to be decided. However when the printer does arrive it will print eight A4 pages a minute at a resolution of 300 dots per inch. This means that a 1mm square contains 140 points. The printer uses the DMA interface on the ST.

The Mega ST itself is to be sold in two versions. The 2MB version will cost £999.95 and the 4MB version £1299.95. Open architecture design will make expansion easy, and it will be compatible with existing ST software. Ports for modems, printers and MIDI are standard and the music features are quite impressive.

The Mega ST and SLM laser printer together form a desk top publishing unit though assessment of the system must await the announcement of the printer's price. Atari are also keen to promote the music capabilities of the various versions of the ST.



● Above: the entry level Atari PC is compact, offers built-in graphic modes and is available very soon.

Apart from the product launches (which included a games machine, the £89.95 XE) the show includes an array of software which is quite astonishing. Both business and entertainment uses are being vigorously pushed. Activision, US Gold and Rainbird were among the companies showing games and Rainbird's *Guild of Thieves* adventure was one of the more interesting and colourful.

The business and non-games packages shown were all touted as making good use of the ST's graphics capabilities and it can no longer be said that the only good software for the machine is games based. *1st Word Plus* would be enough in itself to refute this, with numerous small improvements.

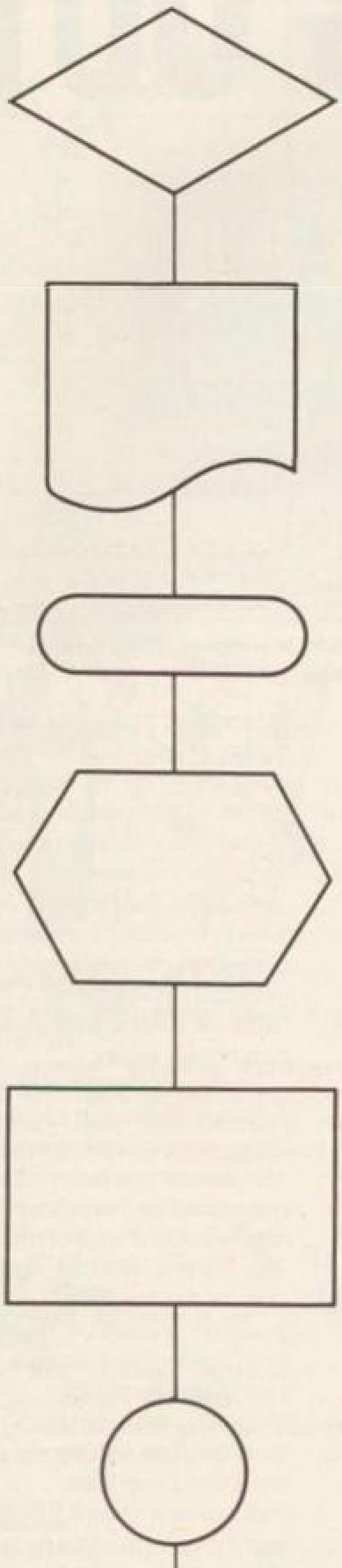
However the variety and quality of programs currently being developed or adapted for the ST will provide plenty of choice for the business or serious home user. One example of the products on offer is Precision Software's *Superbase*, an easily manipulated relational database system with a useful picture/text library.

The hardware launches and software displays at the Atari Show were one thing but the Atari executives themselves were most keen to show the regeneration of their company. Jack Tramiel, who had flown over for the occasion, glowingly praised UK Head Bob Gleadow for his work and a justifiable air of self congratulation could be detected. The company's turnaround is at least impressive with an 81.8 per cent increase in sales from 1985 to 1986, and although they refused to disclose precise figures relating to their performance in the UK market the long-term outlook is very positive.



● Above: the price of this printer remains a mystery.

ADVENTURE BUILDING



This month Pete Gerrard explains the art of text compression in adventure writing

We finished last month's look at parsers with some homework. *It entailed trying to* find some way in which we could introduce a spelling checker into the main body of the parser listing and thus correct any errors the adventure player might make when typing-in instructions. It is hoped that you tried to produce such a routine and if you did you probably reached the same conclusion I did – that it is absolutely impossible.

Well, perhaps not – just very difficult, that is all. A simple check in last month's listing could look for the presence of the word 'hte' and re-translate that as 'the', since there is no such word in the English language as 'hte' and one must assume that the player really meant to type-in the word 'the'. That occupied part of line 4018 and all of line 4700.

Similar amendments to the listing could be made and would allow us to check for other possible typing errors on the part of the player but, as well as being time-consuming, it would also use a good deal of memory, a precious commodity to the adventure game writer. Apart from that, the only sensible way would be to look at that part of the program which checks to see whether a non-recognised noun, for instance, is a recognised verb, in which case the program would inform the player that it had recognised the word but not in the context the player wanted to use it.

We could have a cross-referenced list of words stored in a two-dimensional array, WORD$ say, so that if a non-recognised word – 'OPNE' for example – was found as part of WORD$(21,1), then WORD$(21,2) could contain the word 'OPEN' and insert that in the place of the spelling mistake. That would involve going through the whole parser again to try to analyse the sentence with its spelling mistake corrected and so, on the whole, it is probably not worth the effort involved. We will have to assume that adventure game players can spell.

Since we are producing a text-only game we want to be able to store as much text as possible in memory, to give the player the impression that he is using a large, well-thought-out program. That is not particularly easy to do on most home computers. Some have large amounts of memory and will not need to compress text, although any adventure game gains by having more for the player to read while he is playing the game.

Other home computers have large amounts of memory tucked away somewhere which can be accessed and used to store some room descriptions without eating into our Basic memory. Others have not.

One could store all the text on disk and produce a game, Infocom-style, which reads all its room descriptions and messages from a series of disk files, freeing the main RAM of the computer to cope with the game and not worry about using vast portions of memory to print-out a message which may be seen only once by the player.

Our brief is to produce a stand-alone game, so disk drives are ruled out. We cannot be machine-specific, so there should be no PEEKing behing the ROMs to store data that way. We cannot assume that the computer has a massive amount of RAM to play with in the first place, so that leaves us with the problem of having literally to compress text.

When you see the word simple, ears prick up – it will all be easy this month. Wrong. Simple methods might be simple but they are not very good and tend to be very adventure-specific. What we are trying to do is to produce a generalised text compressor which will work on any adventure you might write and will be relatively easy to transport from one computer to another – as in BBC to Commodore 64, rather than just from one Amstrad PC to another Amstrad PC.

Let us look at something straightforward. Most location descriptions in adventure games tend to start with the words 'You are in a', or 'You have entered' or 'You have arrived at', or something reasonably similar. How about having a set of phrases stored away as a separate array which can be called up every time a certain symbol is met? Like, for example, this:

● **Figure 1**

```
10 A$(1)="You have arrived at a":A$(2)="You are standing in a"
20 REM get on with game for a bit.
1210 REM room description one comes here.
1211  Z$="1 wooden door,  which is an integral part of  a  wooden
house.":GOSUB 1900:RETURN
1220 REM room description two comes here.
1221  Z$="2 large hole in the ground,  with your feet immersed in
something stickily horrible.":GOSUB1900:RETURN
1230 REM get on with game for a bit.
1900 FORI=1TOLEN(Z$)
1902 A$=MID$(Z$,I,1):IFA$="1"THENPRINTA$(1):GOTO1906
1903 IFA$="2"THENPRINTA$(2):GOTO1906
1904 REM a few more A$=
1905 PRINTA$
1906 NEXT:RETURN
```

Not only does this take up a large amount of memory – if used judicially it can save you a reasonable amount as well – it has the effect of making the resultant printout look very jerky, to say the least. Most computers have a number of characters stored in memory which are not accessed easily from the keyboard and anyway adventure location descriptions usually need only the letters of the alphabet, a few punctuation statements, and possibly – but not very often – numbers as well.

Consequently it is usually easy enough to find a collection of 64 or so characters, not part of the previously-mentioned lot, whose ASCII values are consecutive. Say, for example, characters 160 to 223 – fairly common, those. So if instead of line 1902 checking for A$ it could check for the ASCII value of A$, and if it fell between 160 and 223 define a variable A to equal ASCII VALUE–160 and print A$(A), having pre-determined what the 64 strings in A$() will be.

That can save memory but requires plenty of care to get the printout speed looking correct and also requires time and patience to get the descriptions to be spaced properly on the screen. Unless you want to write a interrupt-driven word-wrap routine you will be better doing this kind of thing by trial and error – printing the description on the screen and adding or deleting characters until it all fits into place.

The problem, however, is something rather more than being a little awkward to use. It is very adventure-specific; few adventures set in the Wild West will have anything in common with adventures set in Sherlock Holmes territory, to pick two differing types of adventure at random. Moreover, if you decide to dive into the murky waters of machine code and do all of the foregoing in 6502 code or whatever, you will have a good deal of work to do every time you want to set up a new collection of phrases for a new adventure.

How much better it would be if we could devise a routine which will work for any adventure and which will consistently save more space than that rather long-winded procedure. The answer will be revealed soon. It will give us a typical memory saving of about 35-40 per cent, which is one way of saying that room descriptions which once occupied 18K is now reduced to something a little over 11K – an extra 7K for code, which is not to be sneezed at. Twice the memory Vic-20 had when it was introduced, merely by running the Gerrard text compressor. That is progress.

There are, however, a number of problems attached. Chief among them is that we cannot use numeric or graphic characters and instead are restricted to letters of the alphabet – upper- and lower-case, of course – spaces, commas, full stops, quotation marks and apostrophes. That should, of course, be sufficient to cater for all possible needs and if you want to use anything else in your descriptions you have to change the routine yourself. The great advantage of using it, however, apart from the memory saving, is that one line is used to print-out all room descriptions, wherever the player happens to be – or messages for that matter. Say the variable CP contains the current location. To print the location description which corresponds to location CP we:

POKE 51967,CP:SYS51968

At least, that POKE and SYS work on the version as implemented on the Commodore 64. Other machines will be covered later, when we get down to specifics.

First, how does it work? Most of the computers in the realms of the *Your Computer* readership are what is known as 8-bit computers. Larger business machines fall into the 16-bit group, while some can be described only as 2-bit. We devote ourselves to 8-bit computers now. Being an 8-bit machine, that means that in any one byte a computer is capable of addressing any one of 256 numbers.

One byte in an 8-bit computer consists of eight bits, and that, amazingly enough, is why they are called 8-bit computers. One byte is also the amount of memory occupied by any one character, like the letter 'A', the number '7', the symbol '*' and so on. We can split our one byte into its component eight bits like this:

● **Figure 2**

```
Bit number  7    6    5    4    3    2    1    0
Value      128  064  032  016  008  004  002  001
```

Each bit can be either on or off; there are only two ways about it. An electric circuit is either on or off and so is a bit. If bit zero of byte 1024, say, is on and all the others are off, byte 1024 would contain the value 1. If bit one was on and all the rest were off, the same byte would contain the value 2. If bit three were on and the rest were off, the value 8 would be stored there.

If bits four and five were on and the rest were off, the value of 48 (16+32) would be stored there. By adding all the numbers you reach the value of 255, which means that when all eight bits are turned on the value of 255 is stored in byte 1024. Thus 256 values can be stored in any one byte, since 255 numbers allows us to store 255 values plus one for when every bit is turned off and the byte contains the value of zero.

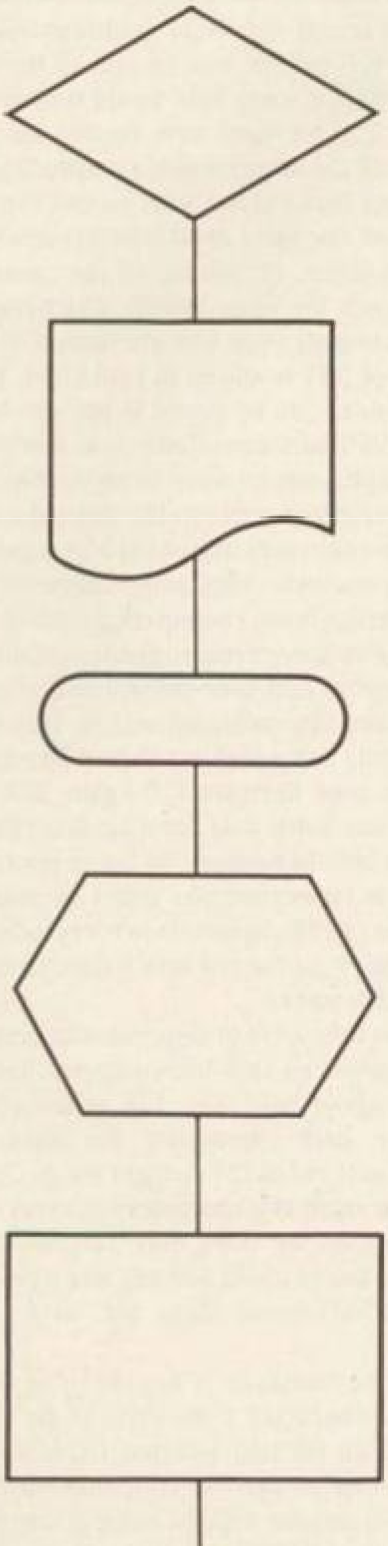
So we can store any one of 256 numbers in any one byte. How many characters is the average home computer capable of displaying on the screen, regardless of different colours and user-defined characters? By an amazing coincidence, 256. With how many bits can a high-resolution Spectrum screen cope horizontally? Again, 256. So when you store your location description somewhere in memory, so far as the computer is concerned you could be storing any one of 256 characters in every location of memory, and so one byte is used to store each character.

What if we were to dispense with certain characters, so that the computer had to worry about only, say, 128 of them? No reverse field characters, for instance, which gets rid of 128 straight away. Could we now store two characters in every one byte, since we have only 128 different ones to worry about and any one byte can store 256 values? Sadly not, as I shall explain.

Say the character 'A' has the value of 65 and the character '1' the value of 20. If we POKEd an 85 into location 1024, would that not tell us that one character with the value 65 and one with the value 20 are now stored there? Think about it – it does not. The number 85 could be made up of any combination of two characters, like 40 and 45, 21 and 64, 4 and 81, and so on. There is

ADVENTURE BUILDING

Cont.



● **Figure 3**

```
  10 REM YOUR COMPUTER PG 13/4/87
  20 X$=CHR$(34):R1$=CHR$(18):R2$=CHR$(146):FORI=
1TO14:CD$=CD$+CHR$(17):NEXT
  30 POKE55,0:POKE56,96:A=1024:B=55296
  40 CO$=CHR$(144):CR$=CHR$(29)+CHR$(29)
  50 POKE 53281,7:POKE53280,9:PRINTCHR$(147)CHR$(
144)CHR$(14);
  60 FORI=0TO39:POKEA+I,28:POKEB+I,0:NEXT:FORI=1T
O23:POKEA+I*40,28:POKEB+I*40,0
  70 POKEA+39+I*40,28:POKEB+39+I*40,0:NEXT:FORI=0
TO39:POKEA+960+I,28
  80 POKEB+960+I,0:NEXT
  90 PRINTTAB(31)R1$"Your Computer"R2$
 100 PRINT:PRINT:PRINTCR$"Enter room description.
.."R1$"(1)"
 110 PRINTCR$"Revise room description.."R1$"(2)"
 120 PRINTCR$"Quit......................"R1$"(3)"
 130 POKE198,0
 140 GETA$:IFA$=""THEN140
 150 IFA$="3"THEN420
 160 IFA$="1"THEN270
 170 IFA$<>"2"THEN140
 180 PRINT:PRINT:PRINTCR$"Enter room number ";
 190 POKE198,0:R$=""
 200 GETA$:IFA$=""THEN200
 210 A=ASC(A$):IF(A<48ORA>57)ANDA<>20ANDA<>13THEN
200
 220 R=LEN(R$):IFA=13ANDRTHENPRINTR2$;:GOTO360
 230 IFA=20ANDRTHENR$=LEFT$(R$,LEN(R$)-1):PRINTA$
;:POKE1662,32:POKE1663,28:GOTO200
 240 IFA=20THEN200
 250 IFLEN(R$)=2THEN200
 260 R$=R$+A$:PRINTR1$A$;:GOTO200
 270 PRINT:PRINT:PRINTCR$"Enter room number ";
 280 POKE198,0:R$=""
 290 GETA$:IFA$=""THEN290
 300 A=ASC(A$):IF(A<48ORA>57)ANDA<>20ANDA<>13THEN
290
 310 R=LEN(R$):IFA=13ANDRTHENPRINTR2$;:GOTO390
 320 IFA=20ANDRTHENR$=LEFT$(R$,LEN(R$)-1):PRINTA$
;:POKE1662,32:POKE1663,28:GOTO290
 330 IFA=20THEN290
 340 IFLEN(R$)=2THEN290
 350 R$=R$+A$:PRINTR1$A$;:GOTO290
 360 R=VAL(R$)
 370 IFR>64ORR=0THEN30
 380 R=R-1:POKE51976,R:R=R+1:SYS51968:GOSUB660:GO
TO490
 390 R=VAL(R$)
 400 IFR>64ORR=0THEN30
 410 R=R-1:POKE51967,R:R=R+1:SYS51968:GOTO470
 420PRINT:PRINTCR$"Are you sure (Y or N)?"
 430 GETA$:IFA$="Y"THEN460
 440 IFA$="N"THEN30
 450 GOTO430
 460 PRINTCHR$(147);:END
 470 PRINTCHR$(147);
 480 PRINTCHR$(14);
 490 PRINT:PRINTCHR$(19)LEFT$(CD$,10)R1$;:FORH=1T
O40:PRINT" ";:NEXTH:PRINTCHR$(19);
 500 PRINTCHR$(19)LEFT$(CD$,12)"Room number "R1$;
R;CHR$(157)"."CHR$(19);
 510 PRINTCHR$(19)LEFT$(CD$,14)R2$"To compress:"R
1$"]"R2$;CHR$(19);
 520 GETA$:IFA$=""THEN520
 530 IFA$="]"THEN610
 540 IFA$=","ORA$="."ORA$="'"ORA$=" "ORA$=CHR$(34
)THEN600
 550 A=ASC(A$):IF(A>64ANDA<91)OR(A>192ANDA<218)TH
EN600
 560 IFA$=CHR$(20)THENPRINTA$;:GOTO520
 570 IFA$=CHR$(13)THENPRINTA$;:GOTO520
 580 IFA$=CHR$(17)ORA$=CHR$(145)ORA$=CHR$(29)ORA$
=CHR$(157)ORA$=CHR$(19)THEN600
 590 GOTO520
 600 PRINTA$;:GOTO520
 610 SYS51776
 620 GOSUB660:PRINTCHR$(19)LEFT$(CD$,14)R1$"SPACE
"R2$"to return to menu."CHR$(19);
 630 POKE198,0
 640 GETA$:IFA$<>" "THEN640
 650 GOTO30
 660 PRINTCHR$(147);
 670 SYS51455
 680 PRINT:PRINTCHR$(19)LEFT$(CD$,10)R1$;:FORH=1T
O40:PRINT" ";:NEXTH
 690 PRINTCHR$(19)LEFT$(CD$,12)"Room number "R1$;
```

no way of knowing which two numbers originally went into making up that number of 85.

If you study the diagram of how a byte is made up, you will see why. Look at the bits which have to be turned on to make the number 85. Unfortunately, it is not possible to store two separate numbers with values of anything up to 128 and then later distinguish those two numbers from any other two numbers.

If we used only numbers 0-16 we could do it. Sixteen times 16 equals 256, which is what we can store in one byte, remember? So if we multiply our first number by 16 it is stored in the left-most four bits of the byte. Add our second number, which is stored in the right-most four bits of the byte and you see how two separate numbers with values in the range 0-16 can be stored in one byte.

There is only one problem. There are 26 letters in the alphabet and by using the range 0-16 we have confined ourselves to having room descriptions which use only characters in the range A-Q. That, as you might image, ia a liaale bia annoaing ao aoa ahe leaaa. Replacing anything later with a 'Q' with an 'a' is not very productive.

Twenty-six letters of the alphabet, plus a space, four punctuation marks and another character to indicate whether the letter concerned is an upper-case or a lower-case one, gives us 32 symbols to play with. The numbers 0-32 cannot be stored in one byte and still enable us to distinguish combinations of numbers but if we spread our information over a number of bytes we can then selectively take five

```
R;CHR$(157)"."R2$;CHR$(19);
  700 RETURN
  710 A$=STR$(I):A$=MID$(A$,2):IFLEN(A$)=1THENA$="
0"+A$
  720 RETURN
  730 PRINT:PRINT"Press "R1$"SPACE"R2$" to continu
e."
  740 POKE198,0
  750 GETA$:IFA$<>" "THEN750
  760 PRINTCHR$(147);:RETURN
```

● **Figure 4**

Character	Meaning
CHR$(34)	Quotation marks
CHR$(18)	Reverse field on
CHR$(146)	Reverse field off
CHR$(17)	Move cursor down one line
CHR$(144)	Turn print colour to black
CHR$(29)	Move cursor right one character
CHR$(14)	Switch to upper/lower case mode
A=1024	Start of screen memory
B=55296	Start of screen colour memory
POKE198,0	Empty keyboard buffer
48-57	ASCII values of numerals
20	ASCII value of delete one character
13	ASCII value of RETURN or ENTER
32	ASCII value of space
CHR$(147)	Clear the screen display
CHR$(19)	Move cursor to top left of screen
65-90	ASCII values of lower case letters
193-218	ASCII values of upper case letters
CHR$(145)	Move cursor up one line
CHR$(157)	Move cursor left one character

● **Figure 5**

```
LOADER PROGRAM
>LIST
    5 DIMS(2),E(2),B(2),D(8)
   10 READS(1),E(1),S(2),E(2),B(1),B(2):FORI=1TO8:
READD(I):NEXT
   20 REM
   25 B=0
   30 FORJ=S(1)TOE(1)
   35 READA:B=B+A:POKEJ,A
   40 NEXT
   45 IFB<>B(1)THENPRINT"Lines 200-370 incorrect."
:END
   46 PRINT"Lines 200-370 correct."
   50 B=0:D=0:P=0
   55 FORJ=S(2)TOE(2)
   56 D=D+1:IFD/100=INT(D/100)THENGOSUB90
   60 READA:B=B+A:POKEJ,A:Z=Z+A
   65 NEXT
   66 IFZ<>9456THENPRINT"Lines 1200-1280 incorrect
.":END
   70 IFB<>B(2)THENPRINT"Data error-stop.":END
   80 PRINT"Data entered correctly.":END
   90 IFZ<>D(P+1)THENPRINT"Lines"P*100+400"-"P*100
+490" incorrect.":END
   91 PRINT"Lines"P*100+400"-"P*100+490" correct."
   92 P=P+1:Z=0:RETURN
  100 DATA51918,52095,50944,51826,25663,12961
  110 DATA11340,13782,14736,13518,23256,12886,1236
6,18066
  200 DATA87,248,218,248,87,248,87,248,87,255
  210 DATA87,248,87,248,87,248,87,184,215,248
  220 DATA87,248,87,248,87,248,87,120,87,248
  230 DATA87,248,87,248,87,248,87,248,87,248
  240 DATA87,250,87,248,87,248,87,248,0,3
  250 DATA174,255,202,189,64,203,141,65,199,141
  260 DATA87,199,141,113,199,141,157,199,141,181
  270 DATA199,141,3,201,141,19,201,141,30,201
  280 DATA141,51,201,141,64,201,141,77,201,141
  290 DATA96,201,141,106,201,141,128,201,141,142
  300 DATA201,141,154,201,141,174,201,96,255,0
  310 DATA255,0,255,8,96,97,98,99,100,101
  320 DATA102,103,104,105,106,107,108,109,110,111
  330 DATA112,113,114,115,116,117,118,119,120,121
  340 DATA122,123,124,125,126,127,128,129,130,131
  350 DATA132,133,134,135,136,137,138,139,140,141
  360 DATA142,143,144,145,146,147,148,149,150,151
  370 DATA152,153,154,155,156,157,158,159
  400 DATA162,0,189,128,5,32,0,200,233,1
  410 DATA153,0,195,200,232,192,9,48,239,32
  420 DATA80,200,234,189,0,195,10,10,10,141
  430 DATA253,198,232,189,0,195,41,28,74,74
  440 DATA109,253,198,153,235,99,200,189,0,195
  450 DATA41,3,10,10,10,10,10,10,141,253
  460 DATA198,232,189,0,195,10,109,253,198,141
  470 DATA253,198,232,189,0,195,41,16,74,74
  480 DATA74,74,109,253,198,153,235,99,200,189
  490 DATA0,195,41,15,10,10,10,10,141,253
  500 DATA198,232,189,0,195,41,30,74,109,253
  510 DATA198,153,235,99,200,234,189,0,195,41
  520 DATA1,10,10,10,10,10,10,10,141,253
  530 DATA198,232,189,0,195,10,10,109,253,198
  540 DATA141,253,198,232,189,0,195,41,24,74
  550 DATA74,74,109,253,198,153,235,99,200,189
  560 DATA0,195,44,7,40,10,40,40,40,141
  570 DATA253,198,232,189,0,195,109,253,198,153
  580 DATA235,99,200,234,234,234,234,140,84,200
  590 DATA172,255,199,200,200,200,200,200,140,255
  600 DATA199,192,240,240,15,140,44,199,140,86
  610 DATA199,140,112,199,140,156,199,140,180,199
  620 DATA160,0,140,84,200,32,96,200,173,255
  630 DATA199,201,240,240,5,76,0,199,234,234
  640 DATA96,234,234,234,234,234,234,234,234,234
  650 DATA234,234,234,234,234,240,201,32,240,28
  660 DATA201,44,240,27,201,46,240,26,201,39
  670 DATA 240,25,201,34,240,24,201,27,48,24
  680 DATA201,64,16,23,169,30,96,234,169,27
  690 DATA96,169,28,96,169,29,96,169,31,96
  700 DATA169,30,96,234,105,1,96,169,31,153
  710 DATA0,195,189,128,5,232,64,200,153,0
  720 DATA195,96,120,120,120,120,120,234,234,234
  730 DATA234,234,234,234,234,234,202,234,234,160
  740 DATA0,142,1,199,162,0,96,120,120,120
  750 DATA120,120,173,254,200,109,1,199,141,254
  760 DATA200,162,0,142,1,199,176,16,170,142
  770 DATA3,199,142,57,200,162,5,142,4,199
  780 DATA142,58,200,96,162,5,142,120,200,170
  790 DATA76,113,200,26,214,180,215,70,103,90
  800 DATA234,234,234,234,234,234,234,234,234,234
  810 DATA234,234,234,234,234,234,234,234,234,234
  820 DATA234,234,234,234,234,234,234,234,234,234
  830 DATA234,234,234,234,234,234,234,234,234,234
  840 DATA234,234,234,234,234,234,234,234,234,234
  850 DATA234,234,234,234,234,234,234,234,234,234
  860 DATA234,234,234,234,234,234,234,234,234,234
  870 DATA234,234,234,234,234,234,234,234,234,234
  880 DATA234,234,234,234,234,234,234,234,234,234
  890 DATA234,234,234,234,234,234,234,234,234,234
  900 DATA234,234,234,234,234,234,234,234,234,234
  910 DATA128,162,0,189,0,99,41,248,74,74
  920 DATA74,234,168,185,32,202,32,240,201,189
  930 DATA0,99,41,7,10,10,141,255,201,232
  940 DATA189,0,99,41,192,74,74,74,74,74
  950 DATA74,109,255,201,168,185,32,202,32,240
  960 DATA201,189,0,99,41,62,74,168,185,32
  970 DATA202,32,240,201,189,0,99,41,1,10
  980 DATA10,10,10,141,255,201,232,189,0,99
  990 DATA41,240,74,74,74,74,109,255,201,168
 1000 DATA185,32,202,32,240,201,189,0,99,41
 1010 DATA15,10,141,255,201,232,189,0,99,41
 1020 DATA128,74,74,74,74,74,74,74,109,255
 1030 DATA201,168,185,32,202,32,240,201,189,0
 1040 DATA99,41,124,74,74,168,185,32,202,32
 1050 DATA240,201,189,0,99,41,3,10,10,10
 1060 DATA141,255,201,232,189,0,99,41,224,74
 1070 DATA74,74,74,74,109,255,201,168,185,32
 1080 DATA202,32,240,201,189,0,99,41,31,168
 1090 DATA185,32,202,32,240,201,224,239,240,4
 1100 DATA232,76,1,201,96,234,234,234,234,234
 1110 DATA234,234,234,234,234,234,234,234,234,234
 1120 DATA172,254,201,192,1,240,4,32,210,255
 1130 DATA96,160,0,140,254,201,105,127,76,215
 1140 DATA201,234,234,234,234,234,234,234,234,234
 1150 DATA234,234,76,00,202,234,234,234,234,234
 1160 DATA234,234,234,234,234,64,0,24,185,32
 1170 DATA202,201,64,240,4,76,208,201,96,141
 1180 DATA253,201,160,1,140,254,201,96,234,234
 1190 DATA234,234,234,234,234,234,234,234,234,234
 1200 DATA65,66,67,68,69,70,71,72,73,74
 1210 DATA75,76,77,78,79,80,81,82,83,84
 1220 DATA85,86,87,88,89,90,32,44,46,34
 1230 DATA39,64,162,0,160,4,142,44,199,142
 1240 DATA86,199,142,112,199,142,156,199,142,180
 1250 DATA199,142,84,200,142,3,199,142,57,200
 1260 DATA140,4,199,140,58,200,142,1,199,142
 1270 DATA254,200,140,120,200,142,255,199,160,0
 1280 DATA76,0,199
```

consecutive bits from each byte and use them in turn, since five bits are the number required to give us a value in the range 0 to 31, or 32 different numbers.

Now all we have to do is write a machine code routine which translates what is found on the screen and decodes it so that eight bytes – or characters on the screen – are now translated into five bytes' worth of information; and reads five bytes of information from memory and re-converts it into eight characters again.

If you have just been dazed and confused, do not worry. To put it basically, we will read in our location descriptions, typed-in normally on the screen, in groups of eight bytes or characters. A machine code routine will take care of everything and store the data in memory. When we want to recall it, another machine code routine will re-convert everything to normal and display our location description as it was first typed-in, but now occupying somewhat less than two-thirds of its original amount of memory.

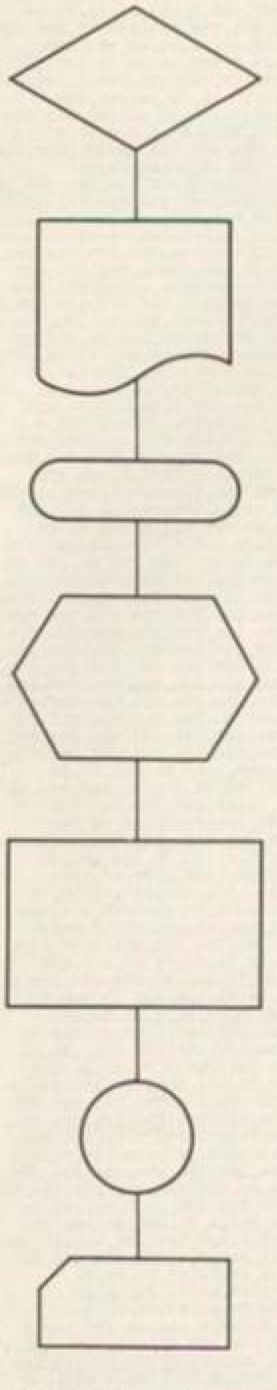
This sadly machine-specific Basic routine allows you to enter your descriptions and then stores them in memory for later recall. You will need to save them to disk or tape using an assembler, monitor, or whatever. To go mad, you will need to save memory from $6000 to $9FFF if you use the maximum allowed 64 room descriptions, each of which, when condensed, occupies a maximum of 256 bytes in memory – around 380-390 characters of uncondensed location description. Those figures apply only to a Commodore 64, of course; others to follow.

Given the following table, you should be able to convert it to run on any home computer.

So much for American Standard Code for Information Interchange. It is like trying to fit a spare Ford Escort engine into something which Nigel Mansell might use to do better than he did in the Brazilian Grand Prix. Line 30, by the way, lowers the top of Basic memory on the 64 to allow us to use 16K up at the top without interfering with anything else. Use HIMEM, or whatever commands your computer might have, instead.

If you look at lines 380, 610 and 670, you will see three SYS calls to machine code routines. These machine code routines are listed – Commodore 64 only:

Cont.



● **Figure 6**

```
BASIC COMPRESSION
>LIST
    5 PRINTCHR$(147);:REM CLEAR THE SCREEN
    6 PRINTCHR$(14);:REM SET UPPER/LOWER CASE
   10 PRINT"You are walking along a dusty, dirty"
   12 PRINT"trail towards the centre of town.  To"
   13 PRINT"the south, behind you, there is nothin
g"
   14 PRINT"but rocks and wilderness, land not fit
"
   15 PRINT"for man nor beast, even you.  To the"
   16 PRINT"north, however, is the town, home of"
   17 PRINT"saloons and good time gals, liquor and
,"
   18 PRINT"if you ever make it that far, a bank a
s"
   19 PRINT"well.  This is your source of money.
Gofor it."
   20 I=I+X:X=0:IFI>367THEN100
   21 Q=0:FORJ=QTOQ+7
   22 B=0
   25 A=PEEK(1024+I+J)
   26 IF(A>0ANDA<27)THEN40:REM LOWER CASE LETTER
   28 IFA=32THENA=27:GOTO40:REM SPACE
   30 IFA=44THENA=28:GOTO40:REM COMMA
   32 IFA=46THENA=29:GOTO40:REM FULL STOP
   33 IFA=34THENA=30:GOTO40:REM QUOTES
   34 IFA=39THENA=31:GOTO40:REM APOSTROPHE
   35 IF(A>64ANDA<91)THENA=A-64:B=1:GOTO40:REM UPP
ER CASE LETTER
   36 PRINT:PRINT"Character not valid.  Re-enter t
ext.":END
   40 IFB=1ANDQ=7THENB=0
   41 A=A-1:A(Q)=A:IFB=1THENA(Q)=31:A(Q+1)=A:Q=Q+1
   42 X=X+1:Q=Q+1:IFQ=8THEN46
   43 NEXTJ
   46 A=A(0)*8:B=(A(1)AND28)/4:A=A+B:POKE49664+P,A
   47 A=(A(1)AND3)*64:B=A(2)*2
   48 C=(A(3)AND16)/16:A=A+B+C:POKE49665+P,A
   49 A=(A(3)AND16)/16:B=(A(4)AND30)/2:A=A+B:POKE4
9666+P,A
   50 A=(A(4)AND1)*128:B=A(5)*4:C=(A(6)AND24)/8
   51 A=A+B+C:POKE49667+P,A
   52 A=(A(6)AND7)*32:B=A(7):A=A+B:POKE49668+P,A
   53 P=P+5
   54 GOTO20
  100 PRINTCHR$(147);:REM CLEAR SCREEN
  102 Z$="ABCDEFGHIJKLMNOPQRSTUVWXYZ ,."+CHR$(34)+
"'$"
  104 Z=0:P=235
  106 FORI=0TO4:A(I)=PEEK(49668+Z-I):NEXT
  108 A=(A(4)AND248)/8:GOSUB120
  109 A=(A(3)AND192)/64:B=(A(4)AND7)*4:A=A+B:GOSUB
120
  110 A=(A(3)AND62)/2:GOSUB120
  111 A=(A(2)AND240)/16:B=(A(3)AND1)*16:A=A+B:GOSU
B120
  112 A=(A(1)AND128)/128:B=(A(2)AND15)*2:A=A+B:GOS
UB120
  113 A=(A(1)AND124)/4:GOSUB120
  114 A=(A(0)AND224)/32:B=(A(1)AND3)*8:A=A+B:GOSUB
120
  115 A=A(0)AND31:GOSUB120
  116 Z=Z+5:IFZ<PTHEN106
  118 END
  120 A=A+1
  121 IFA=32THENX=1:GOTO125
  122 IFX=1THENV=ASC(MID$(Z$,A,1)):V=V+128:PRINTCH
R$(V);:X=0:GOTO125
  123 PRINTMID$(Z$,A,1);
  125 RETURN
```

It works and if you have an assembler or disassembler you will be able to take it to pieces and see precisely how it fits together. If you have not or do not have a Commodore 64 but still want to use the routine, here is the same thing in Basic, which will do the same thing but, of course, at a much slower rate:

This is much easier to adapt for other machines and if you do not understand about truth tables, ANDs and ORs, I fear that is a little beyond the scope of this article. There are plenty of books on the subject, so unfortunately you will have to be content with the fact that it works.

Anyway, back to conversion. All you need to know are the position of the top left-hand corner of the screen in memory – location 1024 on the Commodore 64, as used in line – the ASCII values of characters as spelt out in lines 26-35, and to find somewhere safe in memory to store your information after altering the top of Basic memory, using HIMEM or whatever. This refers to the POKE 499xxs everywhere.

Compared to the Commodore 64 machine code version this runs like a disease-riddled snail but at least it works. It is also much easier to convert for other computers. The printout on the screen is pleasant, as it is done at a fast enough speed to keep the interest of the player without being so fast as to be illegible – as if written by an invisible hand, as someone once described it.

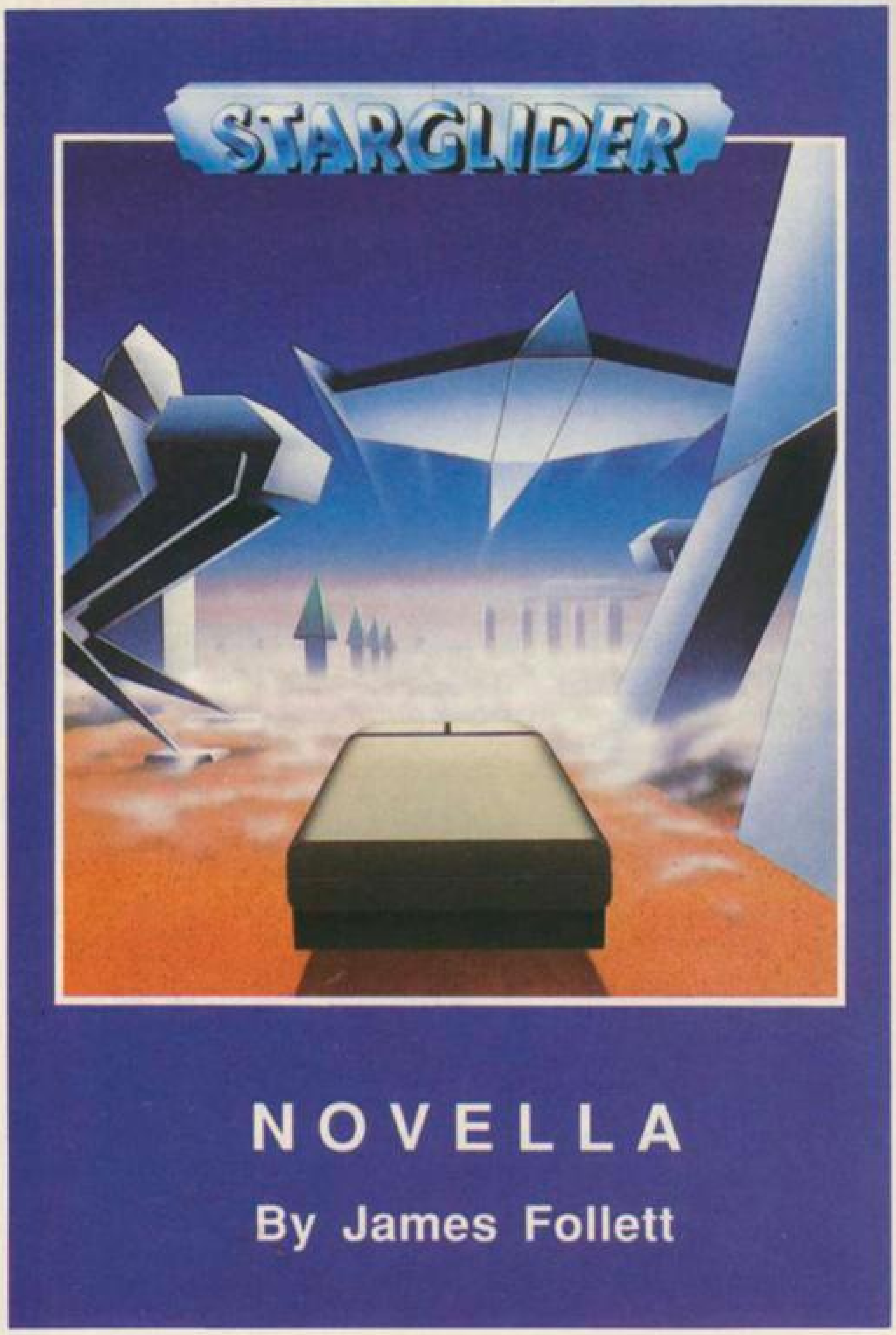
Both this Basic and the earlier machine code program work in the same way. Take a string of characters – Z$ in the Basic program, just a collection of 32 consecutive bytes in the machine code one – find the values of the eight/five-byte decoding and recoding, and print the appropriate character.

Use the program headed Demonstration Model to enter your location descriptions, up to a maximum of 64 as noted. On the bottom line of the text area when entering your description, do not use more than about the first 15 characters, because if you do the rest will be ignored. That still gives you 64 descriptions, each of a maximum of about 380 characters which, when compressed, will occupy some 250 characters each – reasonable saving.

There is plenty of theory but not much work this month, so your homework must be to understand the theory behind the text compression technique. When you do, Commodore 64 owners can relax secure in the knowledge that all they have to do by the time next month's *Your Computer* appears is to enter the 64 room location descriptions. The remainder can either live with the slowness of the compression technique – which, after all, only you will see; the person playing the game will see the resultant printout, or try dabbling in machine code.

Having squeezed our quart of text into a pint of memory, next month we will start building the vocabulary of the game and seeing how the two parts discussed so far – parser and text compressor – are used to generate the beginnings of the adventure game.

COMPETITION



This month we are offering five copies of each of two of the most exciting games to be released in the last few months, Rainbird's *Starglider* and *The Pawn*.

Starglider is the game entirely to blame for the low productivity of certain *Your Computer* staff, which may or may not convince you that it is worth having. Once you've begun blasting away at the disturbing variety of enemies trying to block your intergalactic progress we can guarantee that you too will be spending a lot of time out there.

The Pawn is an illustrated adventure of rate quality and imagination. Set in the fairy land of Kerovnia (from which you are trying to escape) *The Pawn* is enriched by many interesting characters and situations with which to interact, all illuminated by the stunning graphics. Addictive stuff.

Both games are packaged to the usual high Rainbird standards and include a lengthy novella each, as well as hints and instructions.

To enter simply send your answers to these five questions along with your name, address and preferred format to *Your Computer*, Greencoat House, Francis Street, London SW1

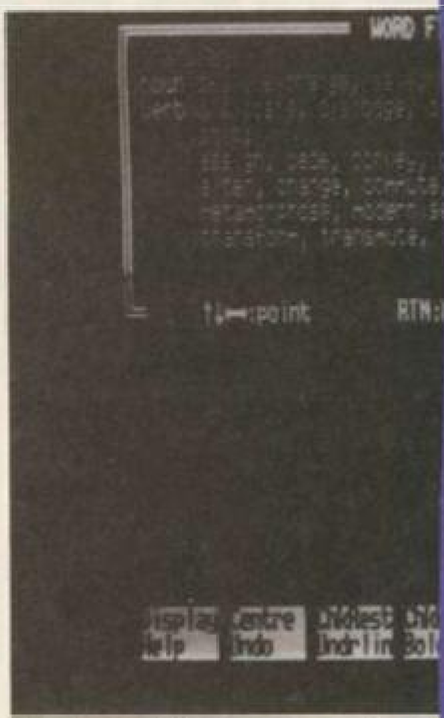
TAR 4

This is particularly time-consuming when a document is being written to a specific word or line count, as the new word-counting program can be invoked only from the opening menu. Previous versions of WordStar leave the layout settings as the user left them unless he exits WordStar altogether and returns to the operating system.

Thesaurus

WordStar Professional packages have always included spelling and mail merge software, and this new version is no exception. This version goes one step further by including a new facility, an on-line thesaurus called Word Finder. Like CorrectStar, the spelling checker, Word Finder only becomes useful when installed on a hard disk. The dictionary and thesaurus files are extremely large and only the capacity and speed of a hard disk can do justice to the elegant design of the software.

Word Finder is a TSR program, like Sidekick, and must be loaded from the DOS ... as part of a start-up batch file ... It is remarkably



● Above and below: the wonders o

ily add their jargon to a supplementa tionary so that it will not be queried

Alas, CorrectStar, like all spellin kers, is unable to spot errors whe wrong word has been used. If yo "core" instead of "care" it will pas marked.

Other features never ...

1DG, to arrive by Monday 6 July 1987.

Competition Rules

The winners of the competition will be the persons who send the first all-correct entries drawn from all those received before the closing date of the competition.

The names of the winners will be announced in the August issue of *Your Computer*.

All entries must arrive at the *Your Computer* offices by Monday 6 July 1987.

Each person must enter the competition only once.

Entries to the competition cannot be acknowledged.

No employees of Focus Investments nor their agents or close relatives may enter the competition.

The decision of the Editor in all respects of the competition will be final.

No correspondence with regard to any aspect of the competition will be entered into.

Focus Investments assumes no responsibility or liability for any complaints arising from this competition.

QUESTIONS

1. What was the first machine for which *Starglider* was released?
2. Who is the author of *Starglider*?
3. Which software company wrote *The Pawn* for Rainbird?
4. Which famous programming partnership is generally credited with writing the first mainframe computer adventure game? Is it:
   A) Kernigham & Ritchie?
   B) Crowther & Woods?
   C) Crowther & Dalglish?
5. Which company owns Rainbird Software?

Name ....

Address ....

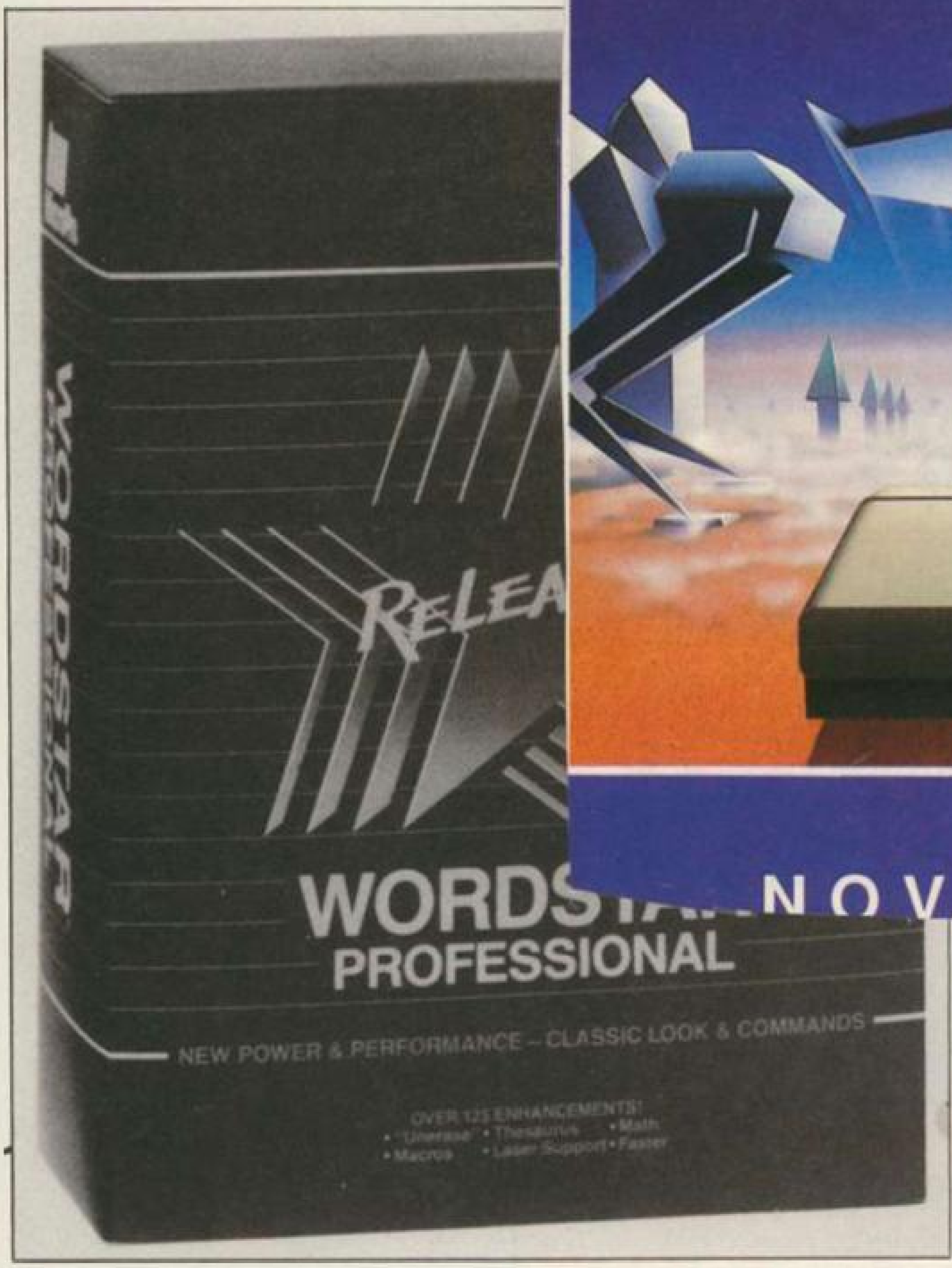
Pawn

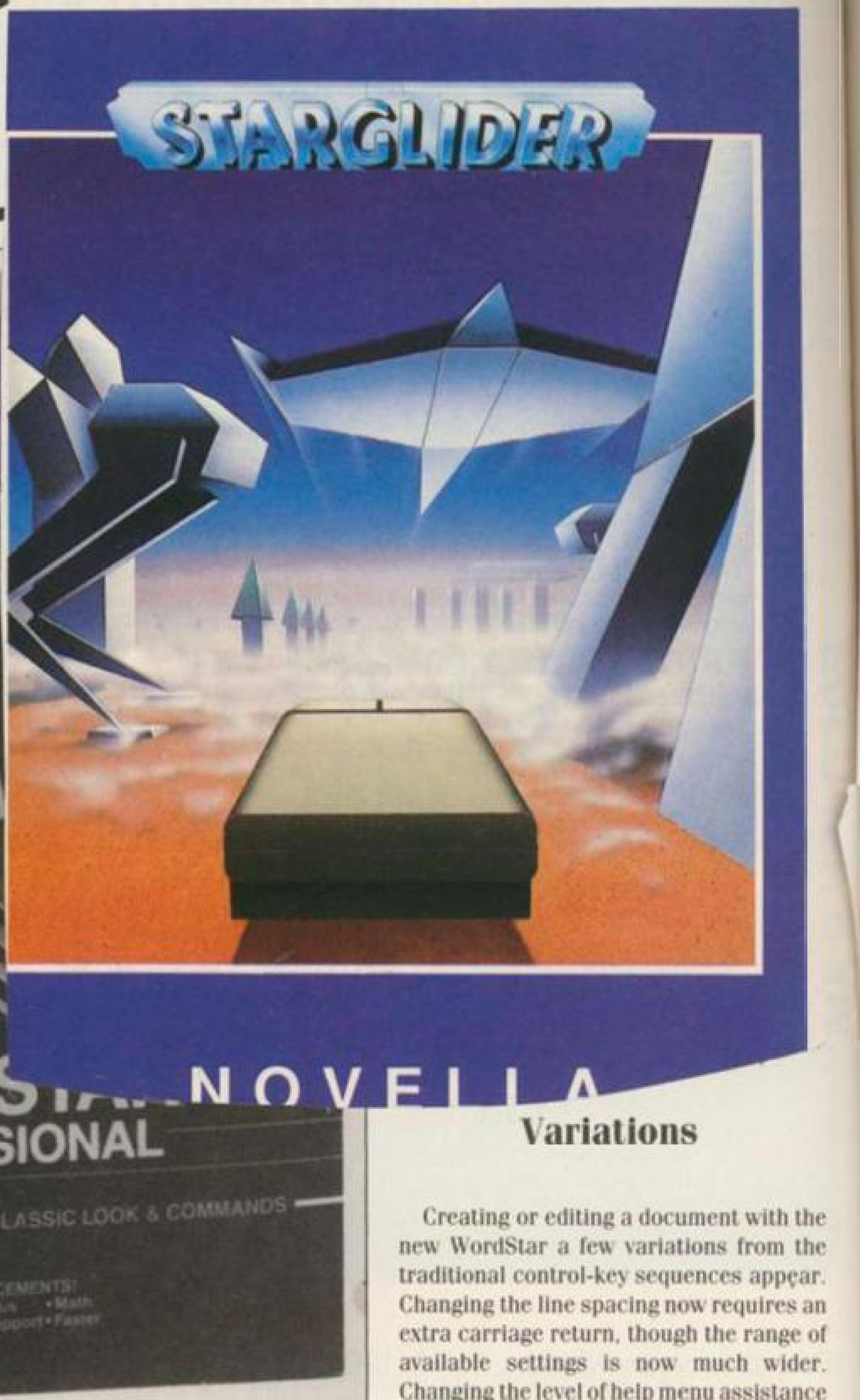
- ☐ Atari ST
- ☐ Amiga
- ☐ Macintosh
- ☐ Commodore 64/128 (disk)
- ☐ Amstrad PCW 8256
- ☐ Atari 800 (disk)
- ☐ Amstrad 6128
- ☐ Spectrum 128 (cassette)
- ☐ Apple II

Starglider

- ☐ Atari ST
- ☐ Amiga
- ☐ Apple II
- ☐ Commodore 64/128 (disk & cassette)
- ☐ Amstrad PCW 8256
- ☐ Amstrad 6128
- ☐ IBM
- ☐ Spectrum 48/128 (cas)

WO





WordStar Professional Release 4.0 is a classic defeat of revolution by evolution. Its publisher Micropro had a smash hit with the WordStar line in the heyday of CP/M, but then concentrated on new products which bore little resemblance to the classic WordStar other than the name in some cases.

The procession of WordStar 2000, Easy and WordStar 1512 left many old-time WordStar users disgruntled that their favourite word-processor was not being upgraded to take advantage of the latest WP features. Some even defected to a look-a-like program called *NewWord*, which looked and felt like WordStar but had the audacity to include many long-awaited features not yet available from the Micropro camp, and at a lower price.

With considerable style, Micropro killed two birds with one stone. Buying the upstart NewWord developments effectively eliminated the irritation of another company eating into Micropro's market. Meanwhile, the brains behind NewWord went into a huddle with the Micropro team to come up with a completely renovated WordStar which combined up-to-date functionality with the traditional WordStar look and feel.

Influence

WordStar 4. 0 clearly shows the NewWord influence. The program files are now mostly .EXE rather than .COM files, and the overall size of comparably set-up systems has grown considerably. WordStar 4 can be run on floppy disk system, but the meagre 360K of storage on a PC-compati-

Variations

Creating or editing a document with the new WordStar a few variations from the traditional control-key sequences appear. Changing the line spacing now requires an extra carriage return, though the range of available settings is now much wider. Changing the level of help menu assistance uses a revised sequence of keystrokes which will irritate the seasoned WordStar user at first.

Where a particular sequence of editing commands needs to be repeated a number of times the appropriate keystrokes can be entered into a keyboard macro in the fashion made popular by Lotus 1-2-3. In the past, many WordStar users have adopted similar tactics by using third-party macro generators.

One change which some users will consider retrograde concerns the loss of margin settings and line spacing when a document is closed and the user returns to the opening menu. When the document is reopened the settings revert to the defaults. The text which has already been entered retains the layout it was given at the time of writing, but if any alterations or additions are to be made, the layout settings must be returned to the old values.

TAR 4.0

This is particularly time-consuming when a document is being written to a specific word or line count, as the new word-counting program can be invoked only from the opening menu. Previous versions of WordStar leave the layout settings as the user left them unless he exits WordStar altogether and returns to the operating system.

Thesaurus

WordStar Professional packages have always included spelling and mail merge software, and this new version is no exception. This version goes one step further by including a new facility, an on-line thesaurus called Word Finder. Like CorrectStar, the spelling checker, Word Finder only becomes *useful when installed on* a hard disk. The dictionary and thesaurus files are extremely large and only the capacity and speed of a hard disk can do justice to the elegant design of the software.

Word Finder is a TSR program, like Sidekick, and must be loaded from the DOS prompt or as part of a start-up batch file before WordStar itself. It is remarkably straightforward to use – just position the cursor on a word you wish to look up and press ALT-1. A window opens at the top of the screen and within a second the synonyms for the selected word appear. If none of these appears suitable, more alternatives can usually be raised by looking up one of the words within the window. Another keystroke substitutes the new word for the one in the original text.

Primitive

For some years the Micropro spelling checker was a rather primitive piece of software known as SpellStar. One of the major innovations of the otherwise unremarkable WordStar 2000 was a completely new spelling checker known as CorrectStar. This has now been implemented as part of the WordStar professional package, where it offers a fast and convenient way of looking up a single word or checking through a complete document. As CorrectStar searches through the text, unrecognised words are automatically queried. Often CorrectStar is able to suggest the correct spelling of a mistyped word, and making the substitution is a single-keystroke operation. Writers with specialised vocabularies can easily add their jargon to a supplementary dictionary so that it will not be queried.

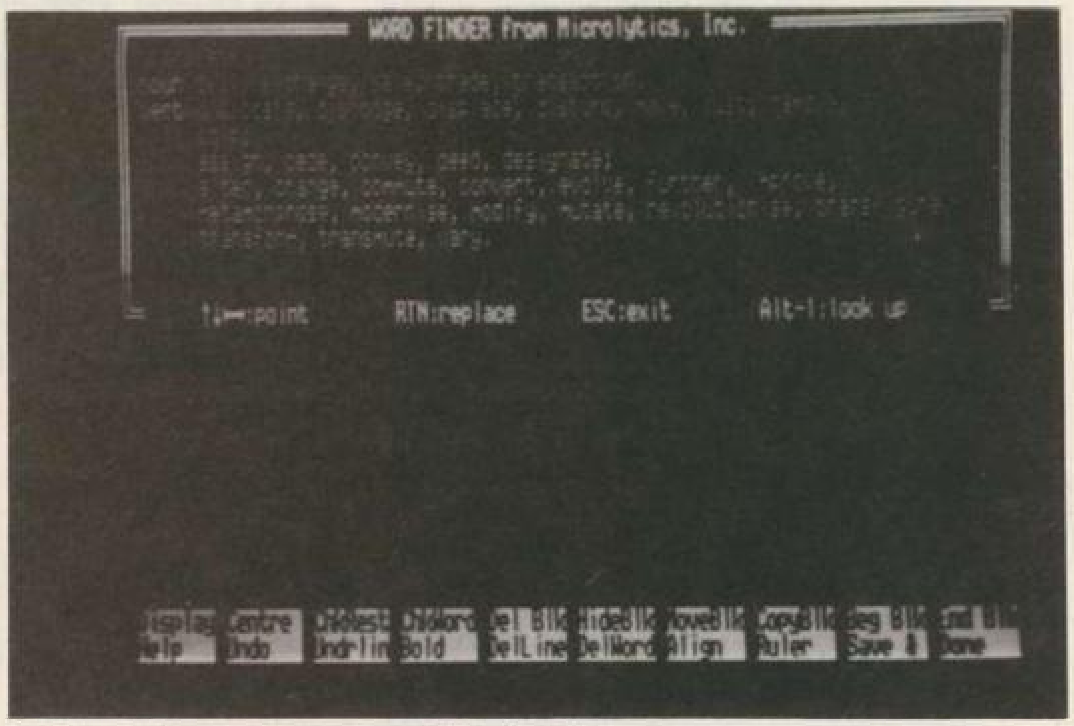
Alas, CorrectStar, like all spelling checkers, is unable to spot errors where the wrong word has been used. If you type "core" instead of "care" it will pass unremarked.

Other features never before seen in WordStar Professional include built-in arithmetic functions and rudimentary box-drawing. The latter would come into its own particularly when used in conjunction with a laser printer driver. Sadly, though, no Postscript driver is available, so laser printer support is limited to those units which can emulate less sophisticated impact printers.

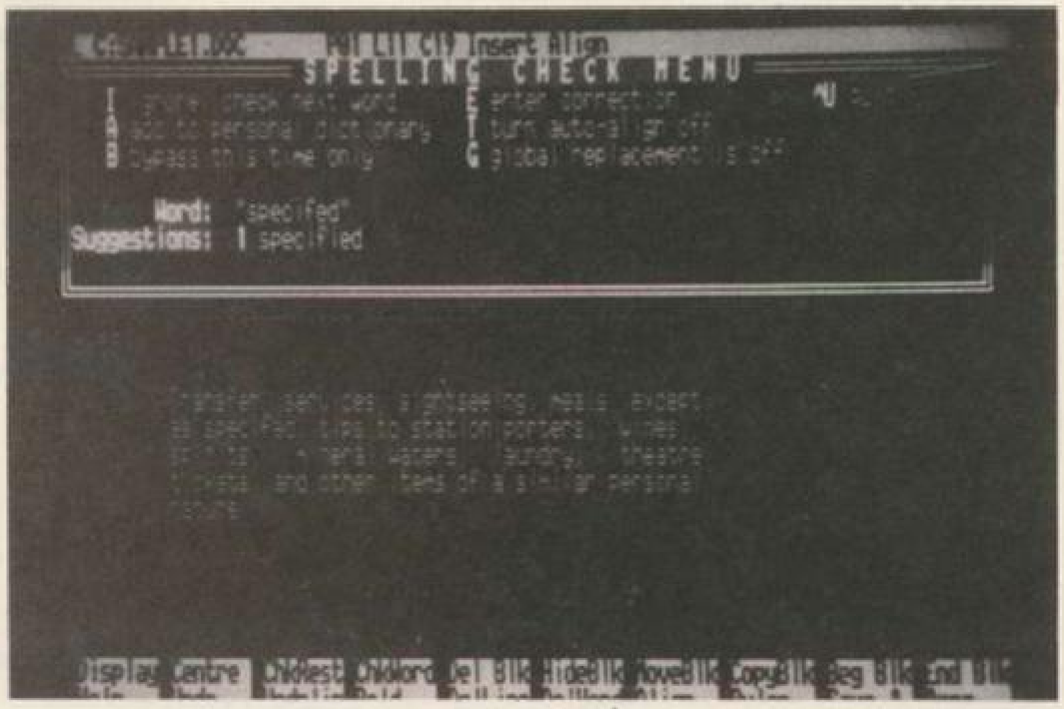
The arithmetic functions are extremely useful. An on-screen calculator is provided for quick calculations, but most PC owners already use something like Sidekick for such purposes. More valuable is a block mathematics function, allowing you to perform some of the functions of a spreadsheet program within a word-processing document.

WordStar Professional 4.0 is a great step forward from the earlier versions, yet it retains the fundamental way of working which long-term WordStar users know so well. It should ensure the continued success of the WordStar dynasty for years to come.

WordStar Professional 4.0
£399.00 plus VAT
Micropro UK 01-879 1122

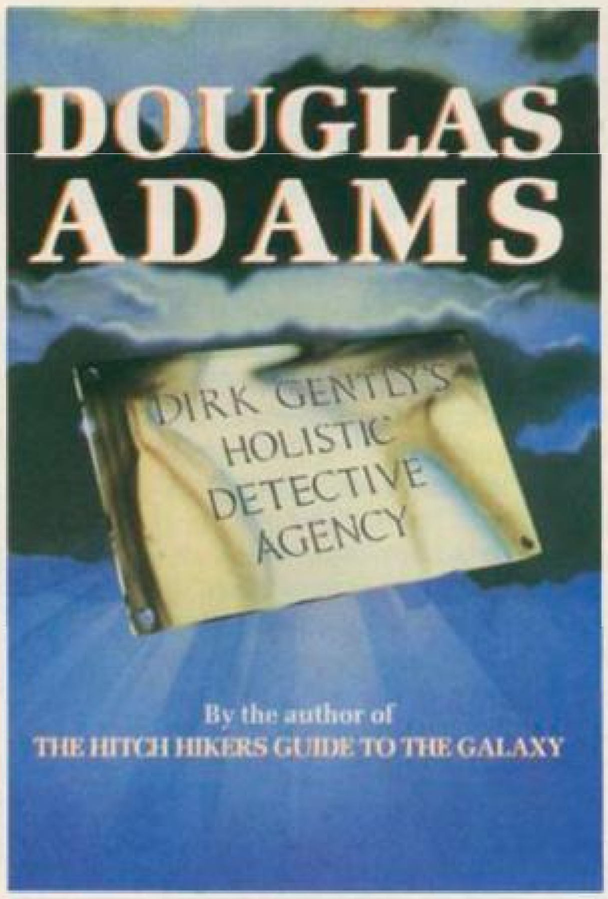


● **Above and below: the wonders of WordStar 4.0.**



GHOST
WRITER

Dirk Gently's Holistic Detective Agency
Author: Douglas Adams
£9.95 hardback
Publisher: Macmillan



It is terrible to be saddled with something you did nearly 10 years ago. There can hardly be a single sentient being in the whole of the known universe who does not know that Douglas Adams wrote *The Hitch-hiker's Guide to the Galaxy*. Large sections of the show are now recited wholesale by children too young to have known the Parrot Sketch.

The immense popularity of HHGTTG means that, whatever Adams does, there will be a large number of readers who will keep expecting Zaphod Beeblebrox to pop up at the most improbable moments.

What Adams needed to do was write a completely new, non-Guide novel. Which is strange, because that is precisely what he has done. In *Dirk Gently's Holistic Detective Agency* he avoids the pitfalls of doing another HHGTTG sequel in all but name, yet provides sufficient techno-humour material to keep most Guide-freaks happy.

Giving a precis of the plot would ruin the book for you. Like all good detective novels, Dirk features some extremely acute plot twists. The likes of Agatha Christie rely heavily on characters who are not what they seem. Adams does this, too, along with liberal helpings of time and space travel, robots and ghosts.

The whole thing takes some time to get rolling – Dirk does not really appear until about halfway through. That gives Adams time to build the main characters – a luxury he did not have with the almost slapstick speed of the Guide books.

Adams is a well-know Apple Macintosh fanatic. The main character in the book has six of the machines and I expected Adams to have the same number. In fact he has only five but he is working on the next one. Computer-based music is also a strong element in the book – another of Adams' preoccupations.

Throughout, the writing is peppered with computing phrases and, not to put too fine a point on it, jargon. For example, a robot monk is subject to an error checking protocol which stops it leaping from a tree in the belief it can fly.

Adams believes that computer nuts will smile knowingly at the bits of jargon, while the uninitiated will skip the more obscure words. That could be true but in a way it is a pity more was not made of the computers. They fulfil a largely decorative role. Computing is now part of the social structure and is almost common language. It is about time computers had their own literature, like horse racing in the work of Dick Francis. This book goes halfway.

The copy I saw was an early proof which Adams had set by printing directly from the Mac. By getting involved in the page layout, Adams found himself re-writing lines to avoid hyphenated word-breaks or ugly paragraphs. The fiddling with the fine detail could be part of the reason the book as a whole feels undisciplined. The pace varies unevenly, from plodding at the start to chaotic at the end.

When he gets into his stride, Adams writes well. It is entertaining stuff, even when some of the jokes use rather well-worn formulae.

The biggest problem is at the end – it all seems rather rushed. You can sense that Adams was up against a deadline and I did not find the ending all that satisfying. In particular, the extremely interesting ghost created early in the story is largely forgotten and then used in a fairly meaningless way at the end.

Dirk Gently has fewer jokes than the Guide – radio series or books. The style of writing is far more mainstream, even though the ideas are, in places, even stranger. This is a more imaginative work. It is simply that the book lacks the tightness of the earlier stuff. It is still funny and entertaining and newcomers to Adams will probably wonder why I feel a little disappointed. Of course, it is almost a guaranteed success. Computer buffs will love it.

Steve Mansfield.



POP-UP PROGRAMS

TSR PROGRAMS CAN BE VERY USEFUL, BUT HOW DO YOU WRITE THEM? ADAM DENNING EXPLAINS ALL

Anyone owning a PC is almost certain to have a copy of some pop-up program – SideKick, WordFinder, THE Index or whatever. These programs run invisibly in the background, until a special key or key combination is pressed. Then they spring into life, popping-up on the screen over whatever program is currently running.

When we want to return to whatever we were doing before we activated the pop-up program we need only press a key or two and the previous program is restored as if nothing had happened. Pop-up programs are so useful and convenient that everyone is producing them these days. But, how do you go about writing such programs?

This two-part article – the final instalment will appear next month – will explain all about pop-up programs and how to write them. As a practical example, this month we are going to write a digital clock program which appears to run concurrently with whatever other program is being used.

Due to the nature of pop-up programs, most are written in 8086 assembly language. This one is no exception, so a certain amount of familiarity with Intel 8086 assembly language is assumed.

In addition, you will need an assembler and a linker to assemble the programs. We recommend Microsoft MASM, which includes the Microsoft linker. Other packages can be used, so long as they accept the same assembler source as MASM. You will also need the DOS utility EXE2BIN, which you should find on one of your system disks.

For those without assemblers, the hex code can be entered directly into memory using the DOS DEBUG utility, and then saved away as a file. The hexadecimal bytes are shown alongside the instructions in the listing.

Before we start examining how pop-up programs work, we must clarify our terminology. Pop-up programs use a technique known as terminating but staying resident, to stay in memory while allowing other programs to run, so they are referred to as TSRs.

How TSRs Work

When a program is executed, DOS allocates a certain amount of memory in which it can run. In the case of programs with the COM extension, this is all available memory, but the more versatile EXE format allows programs to specify their minimum and maximum memory requirements.

When a program ends, it returns to DOS, which releases all the memory it originally gave to the program, as well as any extra memory which that program may have obtained through DOS memory allocation functions. This seems to mean that if a program wants to stay in memory while telling DOS that it has in fact finished running, it needs to play dirty tricks and fool the operating system.

Luckily, the authors of DOS catered for this requirement and provided an alternative exit method, using the KEEP DOS function. This function call tells DOS that a program has finished running, but that a given amount of the memory allocated to the program at execution start should remain allocated. This means that the next program to be run will have less memory available to it, as DOS ensures that the memory kept for a TSR is not used by other programs.

The amount of memory still allocated when a program exits in this way is entirely up to the programmer. So, a large TSR with a lot of initialisation code – which is needed only once – can release the space occupied by this code when it exits, leaving just the amount of memory required.

Once a program has exited in this way, DOS is back in control and the program is never called again. So, what use is it? The only way such a program can regain control is by having previously altered an interrupt vector.

An interrupt vector is an address stored in memory which is used by the microprocessor to tell it what routine to execute when an external interrupt occurs or when an INT instruction is executed. There are a large number of interrupts on the 8086 processor and some of them are used for special purposes.

On the IBM PC and compatibles, further interrupts are used by the hardware and software to perform certain actions. Whenever you press a key, for example, an interrupt is generated and the code jumped to is that pointed to by interrupt vector number 9. Once an interrupt routine has finished processing, it executes a special instruction which returns to the program which was running when the interrupt occurred. Thus, interrupt routines must not alter any registers and must be as short as possible so that the interrupted program is not delayed noticeably.

Altering an interrupt vector seems to be a question of finding the vector concerned and replacing the the address stored there with the address of the routine to be called whenever that interrupt occurs. But, there is a possibility that the interrupt whose vector is being altered may be called while its vector is being altered. One way of avoiding this is to disable interrupts while the vector is being altered. Another alternative is to use the DOS services for getting and setting interrupt vectors.

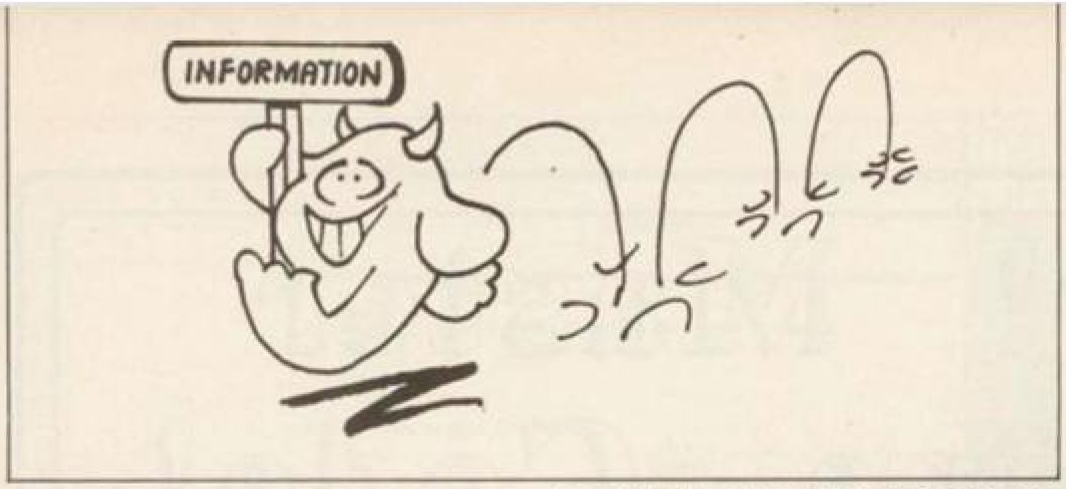
INTERRUPT

The latter method is preferred because, although the interrupt vectors on 8088, 8086 and 80286 in real mode are defined by Intel in a specific location, this is not guaranteed to be the case on new and future Intel microprocessors. The DOS services will safely alter or read the correct vector in all circumstances.

An altered interrupt vector thus causes the TSR to be called whenever that interrupt occurs. Once we have control we can do basically what we like, except that various parts of the operating system are not re-entrant – this means that an area of code may not be executed by two processes at the same time – so must generally be avoided.

When the TSR has finished its tasks, it should not generally execute an IRET – return from interrupt – instruction but must *chain* to the routine which was pointed to by the interrupt vector before it was changed by the TSR. This ensures that every TSR running on a given interrupt is given a crack at the whip. it also means that TSRs which share the same interrupt may interact in ways not intended by the author.





Digital Clock TSR

The digital clock is an extremely straightforward program which is able to display the current time in the top right hand corner of the screen. It does this by setting up the Timer Tick interrupt vector so that each time a tick interrupt occurs, the routine labelled MYINT is called. IBM PCs and compatibles are set up to generate a timer tick interrupt at such a frequency that 18.2 occur per second.

Each time such an interrupt occurs, the clock program calculates the current time and compares the seconds value with the seconds value stored last time the code was called. If the values differ, the seconds, minutes and hours values are stored and displayed on the screen. If the values are the same, no further action is taken. In either case, the routine ends by restoring any corrupted registers and jumping to the previous contents of the interrupt vector, thereby maintaining any chain of TSRs in operation.

INITIALISATION

Looking at the code in more detail, the first thing the program does when executed is to jump to BEGIN. The code from BEGIN to end of the program is the initialisation code; once it has been executed it is required no longer as it does not form part of the interrupt routine. Its first action is to display the program name on the screen. It then uses DOS to obtain the current contents of the timer tick interrupt vector.

This value is returned in registers ES and BX and stored by the program so that the interrupt routine can chain to this address when it has finished. DOS is used to set up the time tick interrupt to point at MYINT, the routine which starts at the very top of the listing, after the jump to BEGIN. Note that the segment address of the routine is passed to DOS in ES and the offset of the routine within this segment in DX.

Once the vector is set up, the program can return to DOS, so it calculates how much memory it needs to keep by working out the highest address used. The code from BEGIN onwards is not needed, so it becomes the highest address. This is converted to paragraphs, because DOS wants it that way, and used as a parameter to the DOS KEEP function. This causes all the memory from the base of the program up to BEGIN to be saved, but all other memory owned by the program is released.

This means that the clock occupies only 512 bytes of your memory – 512 because it is always rounded up to a 16-byte boundary. The first 256 bytes of this is the Program Segment Prefix which every program needs. The first few bytes of this – up to offset 005CH – must not be altered, but the rest is free for our use.

Now that the program has returned to DOS with the interrupt routine installed, the code starting at MYINT will be called 18.2 times a second. The first thing it does is switch to a local stack, as we have no guarantee that the stack used by the interrupted program will be large enough for our needs.

It is always a good idea to have a local stack in an interrupt routine. We need to save the old stack before we do this, so SS and SP are stored in local variables. AX is saved also in a variable as this is used before the new stack is included.

Having provided a new stack, DS is set up to hold the same value as CS, so that our data can be accessed easily, and then all the registers are saved on the stack.

RETURN

Interrupt 1AH, the time-of-day interrupt, is called to determine the current time. The next part of the code, shown in upper case in the listing, converts the number returned by this interrupt into the current time in hours, minutes, seconds and hundredths of seconds. It is fairly complicated but works on all machines regardless of their processor speed.

The seconds are compared with the stored seconds value to see if they are the same. As the routine is called over 18 times a second, this saves time by ensuring that the displayed time is updated only when it actually changes rather than each time it is called. Assuming the seconds values are different, the new seconds value is stored, as so is the current hour and minute.

The ROM-BIOS video interrupt is used to determine the screen mode and number of columns on screen. The number of columns is used to calculate the starting position of the clock. This column value is calculated each time the display is updated to ensure that the clock display works even if we change screen mode.

If we are in screen mode 7, a mono display adaptor is being used, so that screen segment begins at B000H. Any other mode indicates a colour/graphics adaptor, where the screen starts at segment B800H. Please note that the clock display works only in text modes.

Colour adaptors have a number of video pages, so the screen start segment value is adjusted to incorporate the current video page number before the value is stored in ES. Text screens have two bytes per character, the high byte holding the attribute and the low byte the character itself. So, by getting the column position, multiplying by two and using it as an offset into the segment pointed at by ES, we can write directly to screen memory and cause the time to appear. We could use the ROM-BIOS to avoid any possible snow effects, but this method is faster and shorter. Also, very few IBM compatibles actually produce snow.

ROUTINE

The routine DECOUT converts the number in AL to two decimal digits by dividing AX by 10. This leaves the quotient in AL and the remainder in AH. By adding ASCII 0 to both of these, the numeric values become ASCII digits.

The routine OUTCHAR displays each character. It puts the required attribute in AH and uses the STOSW instruction to store AH and AL in screen memory at ES:DI. STOSW increments DI automatically to point at the next screen location. The attribute, 70H, is black text on a white background. If you want to have a different colour scheme you need only change this bvte.

Once all the digits are displayed, the registers are restored, the old stack is swapped in and then the program jumps to the old interrupt routine.

To generate this program, type in the text using an editor and assemble it as follows, assuming you have called it DCLOCK.ASM: *masm dclock/ml;* Then link it by typing: *link dclock;* Now use the DOS EXE2BIN utility to convert it to a COM file:

exe2bin dclock
ren dclock.bin dclock.com
del dclock.obj
del dclock. exe

The program may then be run by typing its name at the DOS prompt in the usual way. If you do not have an assembler and linker, run the DOS DEBUG utility and either type in the hex or type in each instruction. When everything has been entered, save the file out to DCLOCK.COM.

As a simple example of a typical TSR application, the digital clock is ideal. It is short, yet performs a useful function.

```
                PAGE    ,132
                ;************************************************************************
                ;*                                                                      *
                ;*                            DCLOCK.ASM                                *
                ;*                                                                      *
                ;************************************************************************

                ; A program to display a digital clock at the top of the screen

                ; By Adam Denning

                ; Actually made to work 25-10-86

= 000A          LF              equ     0ah
= 000D          CR              equ     0dh

= 0010          VIDEO_INT       equ     10h
= 0016          KEYBOARD_INT    equ     16h
= 001A          TIME_OF_DAY_INT equ     1ah
= 001C          TIMER_TICK_INT  equ     1ch
= 0021          DOS_INT         equ     21h

= 0002          CONOUT          equ     02h
= 0009          PRINT_STRING    equ     09h
= 000A          READ_LINE       equ     0ah
= 0019          CURRENT_DISC    equ     19h
= 0025          SET_INT_VECTOR  equ     25h
= 002C          GET_TIME        equ     2ch
= 0031          KEEP_PROCESS    equ     31h
= 0034          GET_DOS_CRIT_F  equ     34h
= 0035          GET_INT_VECTOR  equ     35h
= 003C          CREATE          equ     3ch
= 003D          OPEN            equ     3dh
= 003E          CLOSE           equ     3eh
= 003F          READ            equ     3fh
= 0040          WRITE           equ     40h
= 0047          GETCWD          equ     47h
= 0048          MALLOC          equ     48h
= 0049          FREE            equ     49h
= 004A          REALLOC         equ     4ah
= 004B          EXEC            equ     4bh
= 004C          EXIT            equ     4ch

= 0002          SET_CURSOR      equ     02h
= 0003          READ_CURSOR     equ     03h
= 000E          WRITE_CHAR      equ     0eh
= 000F          GET_VIDEO       equ     0fh

= E90B          TICCNT          equ     59659           ; Magic number for TOD interrupt

= B000          MONO_SCREEN     equ     0b000h          ; segment address of mono screen
= B800          COLOUR_SCREEN   equ     0b800h          ; segment address of colour screen

= 1000          PAGE_LENGTH     equ     1000h           ; length of video page

0000            code    segment byte public 'CODE'
                        assume  cs:code

                DOS     macro   func
                        mov     ah,func
                        int     DOS_INT
                        endm

002C                    org     2ch

= 002C          ENVIRONMENT_SEG equ     this word

005C                    org     5ch

= 005C          I_PTR           equ     this dword              ; chain to o.. ....
005C  ????      I_OFF           dw      ?
005E  ????      I_SEG           dw      ?

0060  ??        seconds         db      ?                       ; second count

= 0061          mins_hours      equ     this word
0061  ??        minutes         db      ?
0062  ??        hours           db      ?

= 0063          start_column    equ     this word
0063  ??        clock_column    db      ?
0064  ??        clear_this      db      ?

0065  ????      oldss           dw      ?                       ; saved stack segment
0067  ????      oldsp           dw      ?                       ; saved stack pointer

0069  ????      old_ax          dw      ?                       ; saved AX

0100                    org     100h
0100  E9 01FB R start:  jmp     begin

0103  2E: 8C 16 0065 R  myint:  mov     cs:oldss,ss             ; save SS, SP and AX
0108  2E: 89 26 0067 R          mov     cs:oldsp,sp
```

terminate

but stay

```
010D 2E: A3 0069 R          mov    cs:old_ax,ax
0111 FA                     cli                           ; Disable interrupts and...
0112 8C C8                  mov    ax,cs                  ; ... set up new stack
0114 8E D0                  mov    ss,ax
0116 BC 0100 R              mov    sp,offset start        ; use 0000 - 00FF as stack!
0119 FB                     sti
011A 1E                     push   ds
011B 06                     push   es
011C 8E D8                  mov    ds,ax                  ; make DS == CS

                            assume cs:code,ds:code,ss:code

011E 55                     push   bp                     ; Preserve all registers
011F 56                     push   si
0120 57                     push   di
0121 52                     push   dx
0122 51                     push   cx
0123 53                     push   bx               ; DS, ES, BP, SI, DI, DX, CX, BX

             ; ***************

0124 2A E4                  sub    ah,ah
0126 88 26 0064 R           mov    clear_this,ah          ; clear this byte!

012A CD 1A                  INT    TIME_OF_DAY_INT
012C 91                     XCHG   AX,CX                  ; Get high part of tick in D/
012D 92                     XCHG   AX,DX                  ; and low in AX
012E B9 0005                MOV    CX,5                   ; Multiply times 5
0131 8B DA                  MOV    BX,DX                  ; Save high 16 bits
0133 F7 E1                  MUL    CX                     ; Multiply low 16 bits
0135 52                     PUSH   DX                     ; Save high part of result
0136 93                     XCHG   AX,BX                  ; Save low part of result and
                                                          ; get high multiplicand
0137 F7 E1                  MUL    CX                     ; Multiply high 16 bits
0139 8B CA                  MOV    CX,DX                  ; Save high part of result
013B 8B D0                  MOV    DX,AX                  ; Move middle part of result to
                                                          ; correct reg.
013D 58                     POP    AX                     ; Get carry out of low multiply
013E 03 D0                  ADD    DX,AX                  ; correct middle part of result
0140 83 D1 00               ADC    CX,0                   ; Correct high part if necessary
0143 8B C3                  MOV    AX,BX                  ; restore low part of result

0145 B9 E960                MOV    CX,TICCNT              ; Divide DX:AX by TICCNT
0148 F7 F1                  DIV    CX
014A 8B D0                  MOV    DX,AX
014C 2B C0                  SUB    AX,AX
014E F7 F1                  DIV    CX
0150 8B D3                  MOV    DX,BX                  ; DX:AX = Time in hundredths
                                                          ; of seconds

0152 B9 00C8                MOV    CX,200                 ; Divide by 200 so result fits
                                                          ; in 16 bits
0155 F7 F1                  DIV    CX
0157 92                     XCHG   AX,DX
0158 B1 64                  MOV    CL,100                 ; Find hundredths of seconds
015A F6 F1                  DIV    CL
015C 8B D8                  MOV    BX,AX                  ; BH = hundredths, BL = part
                                                          ; of seconds

015E 8B C2                  MOV    AX,DX
0160 2B D2                  SUB    DX,DX
0162 B9 001E                MOV    CX,30                  ; Find the rest of seconds
0165 F7 F1                  DIV    CX
0167 D0 E2                  SHL    DL,1
0169 02 DA                  ADD    BL,DL                  ; BL = seconds

016B D0 E1                  SHL    CL,1                   ; 60 min/hr
016D F6 F1                  DIV    CL
016F 8B C8                  MOV    CX,AX                  ; put hrs. and mins. in the
                                                          ; right registers
0171 86 CD                  XCHG   CL,CH
0173 8B D3                  MOV    DX,BX                  ; Put secs. and secs/100 in
                                                          ; right registers
0175 86 D6                  XCHG   DL,DH

0177 3A 36 0060 R           cmp    dh,seconds             ; a new second started?
017B 74 4B                  jz     notime                 ; leave if not
017D 88 36 0060 R           mov    seconds,dh             ; else store new second
0181 89 0E 0061 R           mov    mins_hours,cx          ; and minute and hour
0185 B4 0F                  mov    ah,GET_VIDEO           ; get current video mode and
                                                          ; page
0187 CD 10                  int    VIDEO_INT
0189 80 EC 08               sub    ah,8                   ; 8 chars for 00:00:00
018C 88 26 0063 R           mov    clock_column,ah        ; store clock start colum
0190 3C 07                  cmp    al,7                   ; is screen MONO?
0192 75 05                  jnz    colour                 ; branch if not
0194 B8 B000                mov    ax,MONO_SCREEN         ; else AX = screen segment
0197 EB 0C                  jmp    short mono

0199 2A DB          colour: sub    bl,bl                  ; get video page number in BX
019B 86 DF                  xchg   bl,bh
019D B8 0100                mov    ax,PAGE_LENGTH SHR 4   ; length of video page in
                                                          ; paragraphs
```

```
01A0  F7 E3                           mul    bx                       ; get current page segment
01A2  05 B800                         add    ax,COLOUR_SCREEN
01A5  8E C0                   monset: mov    es,ax                    ; get screen segment in ES
01A7  8B 3E 0063 R                    mov    di,stm
01AB  03 FF                           add    di,di
01AD  FC                              cld
01AE  A0 0062 R                       mov    al,hours                 ; output hours
01B1  E8 01E7 R                       call   decout
01B4  B0 3A                           mov    al,':'                   ; followed by a colon
01B6  E8 01F7 R                       call   outchar
01B9  A0 0061 R                       mov    al,minutes               ; then the minutes
01BC  E8 01E7 R                       call   decout
01BF  B0 3A                           mov    al,':'                   ; another colon
01C1  E8 01F7 R                       call   outchar
01C4  A0 0060 R                       mov    al,seconds               ; and the seconds
01C7  E8 01E7 R                       call   decout

01CA  5B                      notime: pop    bx                       ; restore registers
01CB  59                              pop    cx
01CC  5A                              pop    dx
01CD  5F                              pop    di
01CE  5E                              pop    si
01CF  5D                              pop    bp
01D0  07                              pop    es
01D1  1F                              pop    ds
01D2  2E: A1 0069 R                   mov    ax,cs:old_ax
01D6  FB                              sti
01D7  2E: 8E 16 0065 R                mov    ss,cs:oldss              ; restore old stack
01DC  2E: 8B 26 0067 R                mov    sp,cs:oldsp
01E1  FA                              cli
01E2  2E: FF 2E 005C R                jmp    cs:I_PTR                 ; chain to previous owner

                              ; DECOUT displays AL as a 2-digit decimal number at ES:DI

01E7                          decout  proc   near

01E7  2A E4                           sub    ah,ah                    ; divide by 10
01E9  B1 0A                           mov    cl,10
01EB  F6 F1                           div    cl
01ED  05 3030                         add    ax,3030h                 ; quick convert to ASCII
01F0  50                              push   ax
01F1  E8 01F7 R                       call   outchar                  ; output one char
01F4  58                              pop    ax
01F5  86 C4                           xchg   al,ah                    ; and fall through to output
                              decout  endp                            ; the other

                              ; OUTCHAR displays the character in AL at ES:DI using an attribute of 70H

01F7                          outchar proc   near

01F7  B4 70                           mov    ah,70h                   ; attribute in top byte
01F9  AB                              stosw                           ; store whole word and inc DI
01FA  C3                              ret                             ; and return
                              outchar endp

                              ; The program starts here
                                      assume cs:code,ds:code,es:code,ss:code

01FB  BA 0229 R               begin:  mov    dx,offset signon         ; print a signon message
                                      DOS    PRINT_STRING
01FE  B4 09              1            mov    ah,PRINT_STRING
0200  CD 21              1            int    DOS_INT
0202  B0 1C                           mov    al,TIMER_TICK_INT        ; get the current timer tick
                                      DOS    GET_INT_VECTOR           ; interrupt vector contents
0204  B4 35              1            mov    ah,GET_INT_VECTOR
0206  CD 21              1            int    DOS_INT
0208  89 1E 005C R                    mov    I_OFF,bx                 ; and store for chaining
020C  8C 06 005E R                    mov    I_SEG,es
0210  1E                              push   ds
0211  07                              pop    es
0212  BA 0103 R                       mov    dx,offset myint          ; then set up vector to point
0215  B0 1C                           mov    al,TIMER_TICK_INT        ; to label 'MYINT' above
                                      DOS    SET_INT_VECTOR
0217  B4 25              1            mov    ah,SET_INT_VECTOR
0219  CD 21              1            int    DOS_INT

021B  2B C0                           sub    ax,ax                    ; clear exit code
021D  BA 020A R                       mov    dx,offset begin + 15     ; address to keep up to
0220  B9 0004                         mov    cx,4                     ; rounded up
0223  D3 EA                           shr    dx,cl                    ; and converted to paragraphs
                                      DOS    KEEP_PROCESS
0225  B4 31              1            mov    ah,KEEP_PROCESS
0227  CD 21              1            int    DOS_INT

                              ; Program Static Data Area

0229  59 6F 75 72 20 43 6F    signon  db     'Your Computer Digital Clock'
      6D 70 75 74 65 72 20
      44 69 67 69 74 61 6C
      20 43 6C 6F 63 6B
0244  0D 0A 24                        db     CR,LF,'$'

0247                          code    ends
                                      end    start
```

resident

SOFT RELEASE

PSI.5 Trading Company, Law of the West, Hardball

Commodore 64
£9.99 cassette
Publisher: U.S. Gold

U.S. Gold has a reputation for producing some exceptional games for the Commodore 64. Putting three of its greatest hits into one package for just £9.99 would seem to be a reasonable way of consolidating that reputation, especially when one of those hits is the excellent *PSI-5 Trading Company*. However, for £9.99 you could get five Mastertronic titles, for example, and still have a few pennies left. Do the three programs stand up against that sort of comparison?

PSI-5 Trading Company is a very good *Elite* style game. As a space freighter captain in the 35th century you have to select your crew and then boldly go where several Commodore 64 programs have gone before, in fact, to the Parvin Frontier, where apparently you will find a collection of starving people who are literally dying to get their hands on you and your ship of supplies. I say apparently, because I've never got there, though not through want of trying.

With my inane crew carefully selected (mad aliens abounding here) even the slightest hiccup saw my demented ship mates go into a frenzy to try to repair the damage. Ably assisted by a number of robodroids, who seemed more intent on examining their fingernails than fixing anything, I was able to ignore such sage advice as turning off the port shields to conserve energy if I were being attacked by pirates on the starboard side of the ship. Check whether a passing spaceship was friend or foe? Blast it out of the skies anyway, just in case. With interesting graphics and music which wasn't written by that Hubbard chap, *PSI-5 Trading Company* is a game to keep going back to.

Unfortunately, game two in this package is not one to load and re-load; load and throw away, really. *Law of the West* is a bit of a disaster, although the author of the program gives himself every excuse by saying that he was trying to create a totally different type of game. A joystick controlled adventure, this sees you in the role of the sheriff of Gold Gulch, a tough wild west town so they tell me, and all you have to do is stay alive until sunset.

I could not get into this game at all. Large, two-thirds screen size graphics dominate the playing area, with the bottom part of the screen reserved for text. Being joystick controlled, however, means that you can select only one from a given number of possible responses, rather than typing in any old thing and seeing what happens. If you love the Adrian Mole adventures, you might like this, but I prefer an adventure to be of the more traditional style, and it was with some relief that I was shot to pieces by a two-bit outlaw. The game then refused to restart, and after listening to the same inane soundtrack three or four times *Law of the West* was filed away, never to be looked at again.



But, two out of three isn't bad, and the last game in this set is probably the best of them all. *Hardball!* (their exclamation mark, not mine) is a superb rendition of the game of baseball. Now, I am not over-familiar with the rules of that game, my knowledge being confined to Peanuts cartoon strips, and what seemed like several hours of reading had to pass by before attempting to play the game, but when I eventually made it, it was well worth the effort. Wonderful graphics of pitcher and striker open the game, with you controlling one or the other depending on whether you happen to be batting or fielding at the time. After a successful hit the display changes to the outfield area, with little fielders scurrying around everywhere trying to collect one of your random swishes at the ball.

It would appear that you can control the thing, but I haven't got the hang of it yet. My only gripe about the game concerns the continuous loading of different sets of data, which halts play and slows things down considerably. Still, it does give you the opportunity to make cups of tea or something before another heroic attempt. Bases covered, third out and nine (whatever that might mean), I can only hope that one day there will be a cricket version and I might be able to understand what's happening.

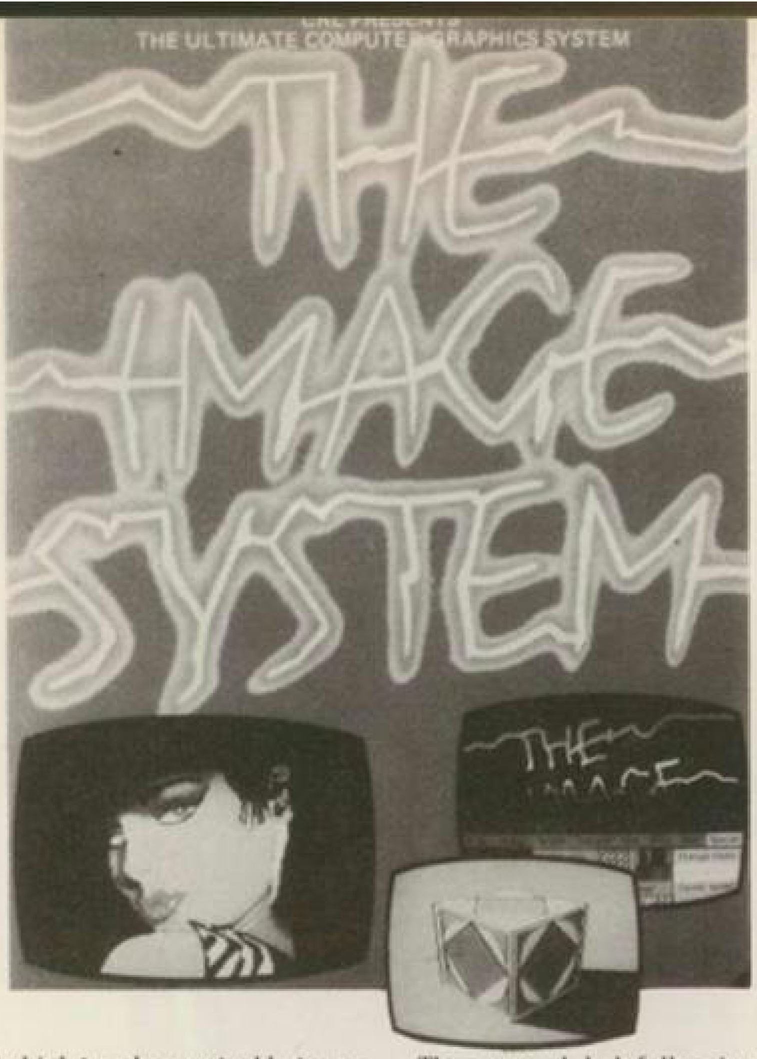
The Image System

Commodore 64/128
Cassette
Publisher: CRL

Well, that's the boast on the front cover anyway. Another Commodore 64 program, this time from CRL, called *The Image System*, and as you might reasonably surmise from that it is a graphic design program. I have never seen any reason to take graphics programs seriously. They're all very well for a bit of a giggle, but when they go about proclaiming themselves to be 'the ultimate graphic system', well, pass me the bottle of whisky, John, I feel a strange thirst coming on.

After waiting an interminable age for the program to load, most of it spent admiring the illustrations on the front cover of the rather lavishly-designed packaging, one was ready on completion of the load to go into raptures and produce beautiful images to adorn some new arcade game of my own devising. Wrong. Not possessing a Wico tracker ball, the first thing the manual did (and is 12 pages really worthy of the description comprehensive?) was to tell me off and inform me that if I only had a joystick then it would just have to do. Great start.

You have to worry about only three keys on the keyboard, these being the Commodore logo key (which toggles the menuy system off and on, allowing you to see your graphics screen in its entirety or not as the case may be), the CTRL key



(which toggles control between the menu and the graphics screen, allowing you either to choose options or continue with your masterpiece) and the Run/Stop key (used, sensibly enough, to stop various graphics actions, like filling in areas in a specific colour, or whatever). Apart from those three, your joystick becomes your paint brush and away you go.

What I referred to as a menu, the company refer to as a Master Control Screen. At least it doesn't have windows floating about everywhere and getting in the way. All the options you could want of a graphics system are available, including such fun things as spray paint, and you have the choice of using a standard hi-res screen or a multicolour one. All the options on the menu have little sub-options available, so that (for example) selecting texture brings up several thousand other options for you to play with.

With all of these it is, as you might imagine, somewhat difficult to go about creating your very own Sistine chapel. When faced with things like stitch lines, different fonts, magnifying images, brush templates, the mind begins to gag somewhat and retreats. Given time and perseverance I have no doubt that someone, somewhere, will make some fabulous displays using this system.

The manual helpfully gives you a Basic program to type in, so that your hi-res screen can be loaded without *The Image System* program being resident in memory. In my case, this produced nothing more memorable than my spray-on graffiti hi-res screen, but it does show that it works.

I would have preferred it if there had been some demonstration screens to go with it, rather than pictures on package covers, but you can't win them all I suppose. Given more time a designer-panic magazine editor will allow, I could actually get to like this program. If you must have a graphic designer, you cannot really do much better than this.

UFO

Commodore 64/128
£1.99 cassette
Publisher: Firebird

Games players owe companies like Mastertronic a great debt. Now you have to pay only £1.99 to find out whether a game is terrible or not. Where one leads others are bound to follow, and Firebird is busy producing a welter of games at the same price. The one under consideration here is a Commodore 64 game called *UFO*, or ULE for Unidentified Loading Errors since it didn't make it into the machine first time around. However, a little bit of perseverance and success! The game had made it, and was safely transferred to disk before any other disasters could befall it. Back-up security copy only, I assure you.

During abortive loading attempts I decided *that I wasn't* going to join the Silver Club, as advertised on the inlay card. Bumper packs of goodies? I'd prefer tapes that loaded first time. I also decided that my knowledge of foreign languages was on the increase, as I can now say "Are you destined to become a fighter ace, take on the Alien Fleet and find out!" in six languages other than English, courtesy of the packaging. Presumably people who can't speak English are meant to be psychic, since the actual playing instructions are only in the mother tongue.

If I detected hostile UFOs approaching New York City I'd let them get on with it, but that would make a very boring game and a waste of two quid. So, man the joysticks and rush to the defence, in our (as usual) superbly equipped F21 Condor Flyer – an experimental craft, so they tell me, which probably means that they have not learnt how to control the most significant bit of the X position of a sprite. I may be wrong.

The controls are simple – up, down, left, right and fire – but require an annoying rush to the keyboard every now and again to hunt out the space bar when the ship's shields needs activating. Rapid-fire joysticks are out as well, since over-firing causes the ship to overheat and short circuit the weapon systems. This, however, was not a major problem, since the UFOs might be hostile, but they are also piloted by brain-damaged aliens. They are not the most menacing of opponents anyway, and soon succumb to the strong right hand of Gerrard.

Wiping out one lot of aliens takes your ship down a transit corridor, which has to be manouevred through quite carefully if you're to get on to level 2. Whilst doing this, if your fingers are agile enough you can press the M and K keys, as well as the space bar, to replenish energy and restore your shields to normal before the next bout. Some of us were not too good at this.

A cheap and cheerful little game, as they say, the kind of



thing that most of us could knock up, given something like *The Image System* to create a hi-res screen or two and a little bit of knowledge about sprites. Good fun, though, despite that, and worth a couple of quid of anyone's money. If I could overcome my loathing of British Telecom and all its subsidiaries I might even begin to like it.

Gunstar

Commodore 64/128
£1.99 cassette
Publisher: Firebird

Honestly, you would have thought that Earth would have been liberated by now. But no, away we go to the year 1997 and another game from Firebird in its £1.99 range for the Commodore 64. Apparently there has been an unprovoked attack on Earth by unknown alien life forms, who quickly managed to overwhelm our primitive Star Wars defences. Ronald Reagan, well into his eighties and still President, eh?

These nasty aliens enslaved almost all of Earth's population. Almost, for you are still free; yes, another chance to save the universe and win the undying gratitude of millions, or at least the person who wrote the game anyway. A research team, hidden in the subterranial moon base (that is

SOFT RELEASE





three

what it says, honestly) have managed to put together an experimental fighter called a Pulse Fighter, and with only your trusty (and probably rusty by now as well) joystick to help you, it is out on to the screen and the chance to decimate thousands of unknown aliens.

Our experimental Pulse Fighter has not yet mastered the ability to move over to the right-hand side of the screen, which is reserved for a bizarre display of fuel consumed, temperature, and score, which seems to bear little relation to what you might be doing at the time.

Five stages to this game in all, so 40 pence a stage. Stage one, zap everything in sight while avoiding enemy fire, so a nice little shoot-em-up there. Stage two has you dodging asteroids to progress to stage three, where you meet the alien command ship, and a jolly tricky blighter it is too. Having blasted away the gun turrets it's time to encounter a robot who is oh-so-wittily called ALLOY, although he might as well be called Jonathan Woss for all the difference it makes; you don't actually get to shake his little robotic hand. Strange choice of companion, but there you go.

Decimate the turrets and you're on to the fifth and final stage, which is a bit easy after all you've been through. Dock with the mothership to refuel, and then you're back to the start again, where very little seems to have changed. Your ship is still experimental, the aliens are still bobbing and weaving with the best of them, and your score is reaching suitably astronomic proportions.

Overall this is not terribly complicated, but good fun nevertheless. It was probably (although I don't know) written by the same person who wrote UFO for Firebird, since the two games bear something of a resemblance; with experimental crafts, aliens rushing about over hi-res screens they both look fairly similar. Of the two, UFO is probably the better, although *Gunstar* is worth a look if nothing else. See if you can pinch a play in the local shop, and if you don't actually get round to buying it at least you can rest easy at night, secure in the knowledge that you can walk into a German Bierkeller and say "Join the Gunstar Fleet and fly your Pulse Fighter against the alien hordes".

Strike

Spectrum 48/128/Plus 2
Cassette
Publisher: Mastertronic

Mastertronic, that pioneer of cut-price software, has produced a little gem of a game for less than £2 with *Strike*. This is available for the Spectrum and all its variants, like Spectrum 48/128, Plus 2, and probably the C5 as well. Joystick compatible with a zillion different interfaces, such as Kempston, Interface II, Cursor, you can also use the keyboard if you wish. You can play against the computer and throw it against the wall when you've finished, or play against a friend and shake his hand while gritting your teeth at yet another absymal defeat. So what is it?

Well, for once you are not pitted against the hell hounds of outer space, but are instead playing the humble game of ten pin bowling. The cassette inlay says that you will be hooked in minutes and playing for hours, and somehow it seems a shame that Firebird's lead in reproducing that sentence in umpteen different foreign languages has not been followed. I rather like the idea of being able to say "hooked in minutes and playing for hours" in French, somehow.

The controls are very simple to master, and if you're anything like me you will be playing it for hours. Using the joystick (much easier) you move it left and right to aim your delivery, press the fire button to move a little man forward carrying the ball, and release the button when you want him to release the ball. Carry on too long and you will foot fault, and can indulge in all the McEnroe histrionics you like, but it will still be a foot fault.

Aiming, despite sounding easy, is not quite so easy when you are playing, and it took some time before I managed to get a strike. Or even a spare, he said, reeling off the phrases as if he's known them for years. Strikes and spares were all Greek to me before I started playing this game, but I can now talk like an expert. Unfortunately talk is as far as it goes, since my playing ability is not yet up to world championship standards.

Graphically this is very good, if limited to the one main display. I do like the way the little man rushes up and delivers the ball; it's worth making a few errors just to see what hap-



pens. I don't really see the point of displaying a message like 'player 1 thinking' while you try and aim the ball. What are you supposed to be thinking about? Cricket? Wigan's chances of promotion to division two? It seems you are supposed to be thinking of playing ten pin bowling, but it fills the screen I suppose.

Having more or less – well, less rather than more – mastered aiming the ball, the next problem concerns releasing the thing. A simple matter of pressing and releasing the fire button on the joystick you might think, but alas, life is not that easy, and many is the disaster you will have before getting things right. A wonderful display of the ball landing on your foot is the reward for messing it up completely.

Once you get into the swing of things it isn't too bad, and I must admit to being addicted. My scores are slowly beginning to creep up a little, although I have yet to muster two strikes in a row, never mind three – this is known as a 'turkey', apparently, which leaves one to wonder what getting four in a row might be called. – For a £1.99 game this is great fun, and even if (like me) you know nothing about ten pin bowling, it's worth getting.

Thrust II

Amstrad 464/664/6128
£1.99 cassette
Publisher: Firebird

Yes, much as I hate to admit it, the mighty right hand of Gerrard was beaten by a mere arcade game. Another little jaunt from Firebird, this follow-up to *Thrust*, named with devastating originality *Thrust II*, is a £1.99 number for the Amstrad 464, 664, 6128, and probably every other Amstrad in the history of the known universe.

Once more we are waging battle in the depths of space, this time on a small, artificially created planet called P2112. We are informed that this is an essential forward base for the next offensive against the Galactic Empire, which seems reasonable to me. Being a Resistance Fighter you know which side your bread is buttered, and it is your bounden duty to make the atmosphere of this artificial planet pure. At the moment it is covered in a cloud of red dust which blocks out sunlight and thus prevents the existence of life on the surface. Fortunately you are told all this on the cassette inlay card, because the game seems to bear little resemblance.

To go about this purification procedure, you must manouevre your spacecraft underground to collect orbs of varying masses. These must be brought to the surface and put in place correctly, but alas for you once they've been removed from their underground storage they become liable to explode within a short space of time if not deposited safely and correctly. This is where the fun, and problems, begin.

As if all this was not enough, the planet is still protected by Imperial Android Guards, and despite sounding like an aftershave they are a mean bunch, let me tell you. They can be killed only by using a chemical agent, and these are stored in boxes inside the planet. Certain chemicals will work only on certain aliens, and if you've got the wrong one for the alien with his hands currently around your throat it's tough luck, buster. A chemical can, however, be used on more than one alien, or android if you prefer, before it loses its potency.

Ready yet? No, because as players of the original *Thrust* will know, the program gets its name from the fact that the ship has a lot of thrust built into it. Start moving, and it is very difficult to stop. What is more, carting around chemicals and orbs for processing the atmosphere all adds to your load, and flying along with a massive orb dangling from the back of your ship is a tricky little procedure, and one which I could not for the life of me master. It all looked remarkably like one of those enormous balls used on the end of cranes for knocking down houses, and with my piloting skill I managed to achieve roughly similar results; disaster every time I took to the air.

In other words, the planet has still got a filthy atmosphere and I am no longer the darling of the resistance movement, having cost them more spaceships than they can afford. Since my flying ability limited, I don't think the Galactic Empire has got too much to worry about. Similar in many ways to the original *Thrust* it is different enough to be worth paying £1.99 for: enjoyable, if not graphically brilliant (very jerky screen movement) game. We'll draw a polite veil over the sound effects.

Octagon

Spectrum 48/128/Plus 2
Cassette
Publisher: Rino Marketing

Some games are easy to play requiring at the most movement horizontally and vertically, with a fire or two thrown in. On reasonable keyboards having to choose from more than four or five keys is not too bad, but on the dreaded Spectrum keyboard having a choice of six different keys is ridiculous. That is if you're using a joystick as well, otherwise you can add another five to that list. Eleven keys to bother with, which is one of the reasons I am not totally addicted to and besotted by a game called *Octagon*, from the quaintly named Rino Marketing, available on cassette for the Spectrum family.

On the plus side, at least it is different. It would appear that you, the player, have been granted secret psychic powers derived from the Octagon symbol and must complete your quest. What is this strange and wonderful quest, one wonders? Well, when you wake up as an Octon you find you are trapped within the confines of a four level complex of 60 cells, it says on the cassette inlay card.

Your quest, should you choose to accept it, is to rebuild your octagon symbol from pieces which have been left carelessly at the core of the complex. Up to four people can play at the same time, which sounds vaguely ridiculous and was not an option I bothered with. You can save and later restore your progress to and from tape if you want to, and if



five

you intend to have a serious stab at this game you will need to, never mind want to. Me, I preferred to record a Little Feat album, but then I'm an ageing hippy.

Graphically this is not particularly awe-inspiring, and some things are not very clear which is not good news for what is really an arcade/adventure. Collecting keys as you go, you can move from one cell to another by entering a transporter, but only if you hold a key and you can also only use transporters of your own colour. Enemies abound, although you have got a gun to stun them with. Only to stun because you must never touch them, as this decreases your pyschic powers, should you have any left after reading the instructions for playing the game.

Sorry chaps, but I was not impressed. It was much too complicated, though I suppose if you had plenty of time to spare you might eventually get the hang of things. You might also be able to design your own nuclear reactor, which might be slightly easier.

Koronis Rift

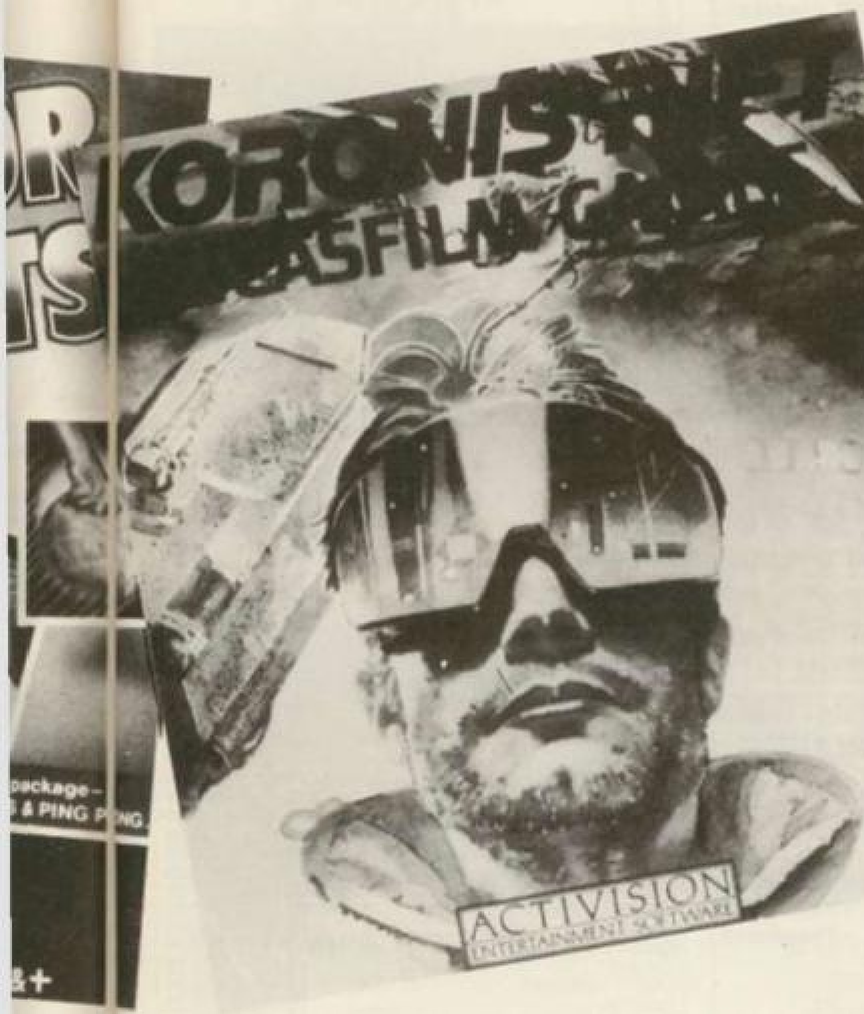
Spectrum 48/128K
Cassette
Activision

Whatever a techno-scavenger's dream might be I have no idea, but this game, apparently, is it. Available for the Atari, Amstrad and Spectrum at least – reviewed here on a Spectrum – *Koronis Rift* comes from Activision, and is a Lucas Films game. This means that you get an amazing amount of packaging to wade through, instructions that make the game seem marginally more complicated than do-it-yourself brain surgery, and while waiting for the thing to load you can ponder on the incredible fact that more than a dozen people were involved in the writing of it. Aric Wilmunder handles 3D environment and explosions, Tom Wahl looked after Science Droid artwork, Douglas Crockford produced the sound effects and music for the Atari version, and so on. Thousands of them, and they had to slip in a thank you to George Lucas as well. There's gratitude for you. Would, however, George Lucas be grateful for this mention? In other words, is the game any good at all when you finally get to see it?

Well, yes and no. Yes it is quite good and no I won't be rushing back to play it as soon as I've finished this review. My course on do-it-yourself brain surgery is now coming along quite nicely, while I haven't mastered this game at all. The theory is simple. It would appear that I am seeking the valuable technologies of the Ancients, in the hope of striking it rich. When I stumble across the Koronis Rift, stuck in a desolate sector of a remote star system, it should be the answer to all my prayers. The hiding place of technological treasures beyond my wildest dreams, all there for the taking. Well, not exactly, because the guardians of the rift have other ideas. Which hulks must I loot? Which weapons and shields do I pack into my battered surface rover? Which technologies will I save? Could I possibly care less? So that's the theory, and it all seems reasonable enough. Roam around a while, pick up a few bits and pieces, then hey ho for the Orion Nebula and a decent pint of Panther Sweat or something. I just can't get the hang of it all.

For one thing the screen display is incredibly cluttered and complicated, with loads of things to watch out for all at the same time. Electronic counter measure devices and radars look totally different in the manual, but place them on the screen and they look exactly alike to me. Half the things you're up against aren't even mentioned at all, just dismissed with the phrase 'other (military) types exist that have not yet been identified'. Well, I wish they's identify themselves to me, I'd be rather keen to learn what I'm up against. The manual then goes on to describe the Final Objective of the game, but it might as well be printed in Greek for all the sense it makes to me, and I know I'm never, ever, going to get there.

You might like this, but I didn't, I'm afraid; it was just too much to bother with. At least you'll get some reasonable



value for your money if you do buy it, but it will take you about a week to understand the thing.

Indoor Sports

Spectrum 48/128/Plus 2
Cassette
Publisher: Advance

All right, I'll confess, I like this one. *Indoor Sports*, from Advance Software Promotions, is a great little cassette for the Spectrum family of computers, and is either keyboard or joystick (lots of interfaces to choose from) compatible. It also contains four very different games as well, which explains the rather long and tedious loading time. Be very careful that you don't manage to wipe out your copy of the game, because the tape deck can also be used to save or load high score tables. Label your tapes carefully.

On completion of loading, you are invited to enter up to four players' names, although if you just want to take on the computer – or have three friends who wish to remain anonymous – then the one name will do. You then decide which of the four games you want to play. A significant wait then ensues while the correct game is loaded from tape.

Ten pin bowling is not a bad version of the game, using the joystick to position a little man who delivers the ball when you tell him to. Nothing brilliant, but everything you could wish for is in there, including correct scoring for strikes and spares, and a reasonable, if not quite reaching brilliant, screen display.

Air hockey is good fun and consists of moving a block around a table while whacking the living daylights out of a puck which, sitting on a mound of air, whisks off towards your opponents goal. He, needless to say, is trying to do the same as you and score, so plenty of joystick action there.

Table tennis is another good one. Just the sight of two table tennis bats floating around in mid-air kept me amused for a while. It seems marginally easier to play the real thing than it is to control the Spectrum bat, moving the joystick backwards and forwards to get backspin or a smash, left and right of course just to return the ball if that's as far as your competence goes. It is fun, but awkward, and the screen display does only the bare essentials, as indeed it does for air hockey.

Darts is darts is darts, and somehow no computer version has ever come near to reproducing the real thing. No beer by the side of the computer is probably its biggest failing, but as far as darts games go this one's good enough and will certainly get you going for the magic one hundred and eighty. The character is definitely wrong on the screen though, since he is lacking the vast beergut which seems to be a prerequisite for playing darts.

As individual games, they would all sit well on a £1.99 tape. For a four in one package, one can't complain at all. And for me, it's back to the darts. Shame about the absence of the beer, though.

Brainache

Spectrum 48/128K
Cassette
Code Masters

Brainache sounds as if it should be a variant on the Mastermind/Connect Four type of game, but no. The Brainache in this game is actually a person, a rotund individual, who is foolish enough to allow you to control his actions. His real name apparently is Harry Jones, a private, and the butt of his friend's humour, who call him Brainache because he is a private of very little brain, forever forgetting things or dropping them. Under your expert guiding, of course, this won't happen.

A game for the Spectrum range of computers, from Codemaster, this rather fun little game can be played using a combination of joystick and keyboard. Joystick for the simple things in life like moving around, while the keyboard is used for slightly more complicated matters like picking things up or dropping them, because this Spectrum game is most definitely in the class of arcade/adventure. At least, that's what Codemaster would probably describe it as, if pushed.

The story so far. It would appear that you have recently been exploring the Stella mines, and while there managed to drop a vast amount of equipment and promptly forgot about it, although how anyone can drop a ladder and remain unaware of the fact is beyond me. Your crewmates aboard the Rotar 1, an interplanetary mining vessel, laugh out loud about your total inability to do anything, ho ho ho they probably go, and send you back to try to recover all the stuff that you dropped. Deep down it would appear that they really love you, but I note that they don't love you enough to accompany you back to the mines and help you. You, Brainache, private Harry Jones, are on your own, pal, with no-one to help you out. And the mines, let me tell you, are rather a nasty place to be.

In play, and in particular in the design of the screens, this game reminded me a great deal of *Boogaboo*, which is odd because *Brainache* bears as much resemblance to the flea hero of that game as I do to Robert Redford, and, as even close friends will tell you, that is not much of a resemblance. You have to explore the rather large game area, avoiding all manner of nasty creepy crawly things as you do so, collecting the odd pieces of equipment which are scattered about like confetti after a wedding. Reasonably enough, some of this equipment is too heavy to be carried with other equipment, and larger things like ladders require carrying on their own, otherwise the stuff that you have already oh so carefully collected will once more become debris on the ground. Eventually you might make it and manage to escape again, but I never manager it. Not, however, through lack of trying, because this is one game that I intend to play again.

YOUR COMPUTER
CLASSIFIED

CONTACT PAUL WILLIAMS
ON 01-222 9090

COPY DATES — JULY ISSUE, 29th May; AUGUST ISSUE, 25th June

AMSTRAD SOFTWARE HIRE

* *Low Rates*
* *Fast Service*
* *Free Membership*
* *100s of Titles*

Our members say we are the BEST

Details from:
K & M COMPUTERS
40 Fairstead, Birch Green, Skelmersdale, Lancs WN8 6RD

RE-USE YOUR OLD PRINTER RIBBONS!

We will re-ink you old fabric ribbon cassette for more cheaply than the price of a new one. Send your dry fabric ribbon (stating printer make & model) with £2 and we'll re-ink it & quote for future re-inkings.

ALADDINK, (Dept. YC),
4 Hurkur Crescent, Eyemouth,
Berwickshire TD14 5AP.
Tel: 08907 50965

BLANK CASSETTES

WITH LIBRARY CASES

	C10	C15	C20	C30
20	7.50	7.70	7.90	8.70
50	16.00	16.20	16.90	18.50
100	29.00	30.00	31.00	35.00

Superior Tapes. Don't Settle for less!

DISKS

10 5¼ DS/DD	£6.50
10 3½ SS/DD	£16
10 3 Amsoft CF2	£26

Prices include plastic cases

MEMOTECH COMPUTERS AND ACCESSORIES

MTX 512 COMPUTER	£75.00
DMX 80 PRINTER	£150.00
RS232	£35.00
PASCAL ROM	£35.00
SPECULATOR ROM	£35.00
½ mb. DISK DRIVE & INTERFACE	£160
1 mb. DISK DRIVE & INTERFACE	£160

All the above prices are fully inclusive. We stock the entire Memotech Range. Orders/Enquiries to:

UK HOME COMPUTERS
82 CHURCHWARD AVENUE, SWINDON, WILTS. SN2 1NH
24-hr Phone Service 0793 695034

Spectrum Repairs

£14.90 inclusive of labour, parts + p&p. Fast reliable service by qualified engineers. Average repair 24 hrs. 3 mths guarantee. For help or advice ring:

HS Computer Services
2 The Orchard, Warton
Preston, Lancs. PR4 1BE
Tel: 0772 632686 327

SPECTRUM PRINTER UTILITIES

For 48K Spectrum and Epson-compatible printers

OURS ARE BETTER!

WORD-MASTER – £9.50 – all the features of an ordinary word processor and more. Multicolumns, graphics, plus all the features your printer offers.

CRASH COPY – £7.50 – all the screen dumps you will ever need! Including shaded, sideways, double-strike and half-size dumps.

TYPELINER – £10.50 – produce 24-pin quality from an 8-pin printer! Design your own fonts and print them in fantastic NLQ.

HEADLINER – £13.00 – signs, letterheadings, leaflets, produce GIANT SIZE print in triple pass NLQ.

Write now for full details of all our software. You'll be disappointed if you don't.

CARDEX COMPUTING
11 Marsh Street, Barrow-in-Furness, Cumbria LA14 2AE

DISKS 3½" D/S with labels. £13 for ten. By return. Access, Visa. Grafton Ltd, Dept (DYL) 147 High Street, Huntingdon, Cambs PE18 6TF. (0480) 51444.

Compatible AMSTRAD ribbons in non-standard colours. Also for most printers.
Details from

Pearldeck Trading Ltd
FREEPOST, Billingford, DISS, Norfolk IP21 4BR

SINCLAIR SERVICE CENTRE

Fast repair service for Spectrum: ZX81 interface 1: microdrive. All units repaired to original standard by our H.N.C. qualified staff average repair cost £15.00. But for free estimate send £1.95 return postage with a brief description of your fault: turnround approx 24 hours: established international service: our work is fully guaranteed. Personal callers welcomed.

QUANTUM 33 City Arcade, Coventry CV1 3HX Tel: (0203) 24632

Certified bulk disks
Full user packs for 39p each – min. quantity 50

Eg 5.25" DS/DD @ 49p min. quantity 50

Postage and packing £1 per batch of 50 ordered

All prices include V.A.T.

We also have a wide selection of software for the Amstrad PC1512 range at 10% off R.R.P.

KBT UK (Ltd)
Carmel House,
85 The Broadway,
West Ealing,
LONDON W13 9BD

AMSTRAD (CPC/PCW) & ORIC/ATMOS

Software for sale or hire
Super Selection of Software now available
★★★ CPC Users – first 3 hires FREE! ★★★
For details, send S.A.E. (stating computer) to:

THE SOFTWARE CLUB
26 Beechley Drive, Cardiff CF5 3SN

ASTROLOGY for beginners only £11.50

A Starter Pack comprising a simple program to calculate a horoscope, an introductory booklet & 2 self-teaching programs (how to interpret the horoscope).

No previous knowledge required

Spectrum, BBC/Electron, Oric, Dragon, Tandy/Genie, Commodore 64/PET, Atari, Sharp, Amstrad/Schneider, Colour Genie, MSX, IBM, Apricot, etc.

many more programs for **experienced astrologers** also other micros

Cash with order (add 50p outside UK) or large sae for free catalogue to: –

ASTROLCALC (Dept YC)
67 Peascroft Road,
Hemel Hempstead, Herts HP3 8ER
Tel: 0442 51809 537

ROTOBASE COMPUTER TURNTABLE

Move your Computer/VDU screen through 360 degrees with the Rotobase. Puts your screen where you want it. Enables shared use of screen and offers easy viewing. Smooth rotation with damping action. Max load 50 kilos. £13.25 plus 60p postage.

OAKDENE SERVICES LIMITED
35 Clickett Hill, Basildon, Essex.

NEW **TAPE UTILITY 9**

This program gives a tape back-up of most SPECTRUM software! Even converts most jerky loaders to normal for reliable loading. Manages very long programs (even 51K!), fast loaders, etc. etc. State type of Spectrum when ordering (48K, 128K etc). **£6.99 on tape (£4.99 if updating).**

NEW **TRANSFER PACK 3 – FOR SPECTRUM TAPE TO DRIVE**

A software system to convert many TAPE based programs to your DRIVE (no matter what type) + OTHER USEFUL UTILITIES. Most jerky programs are EASILY converted to drive. Pack has at least 7 programs! Opus/Beta owners add £1 for OPTIONAL extra program. **State TYPE of Spectrum + name of DRIVE when ordering.** (e.g. 128K Spectrum and Microdrive). **£11.99 on tape OR £12.99 on m/drive cartridge.** (£6 if updating).

INFORMATION SHEETS Approx 8 transfers of popular programs per sheet – needs TP3. **SPECIAL OFFER (with SAE) – No's 1-20 now £4.50, No's 21-30 only £3.50.**

MICROTRANS 2b – for m/drive to m/drive back-up, easy ERASE, tape to drive (inc headerless) – does NOT convert programs. Includes MICROTAPE and RUN programs. ONLY £3 on TAPE. £4.50 on Cart. For any Spectrum. **CODE COMPRESSOR** – £3.50

AMSTRAD – TAPESPEED 2 – for tape back-up. Only £6.99 (state whether 464 or 6128)

Overseas: add £1 Europe, £2 others each product. SAE for details.
NO RISK! – ALL PROGRAMS CARRY OUR MONEY BACK GUARANTEE (not updates)

LERM, DEPT YC, 11 BEACONSFIELD CLOSE, WHITLEY BAY. NE25 9UW.
(Tel: 091-2533615)

BRADWAY SOFTWARE (YC)

LETTA-HEAD PLUS The most versatile Spectrum utility program for designing and printing business & personal stationery; receipts, letterheads, labels, posters, etc. Create the design on screen using inbuilt graphics or load any SCREEN$ from an arts package, add text from the library of 25 different fonts, select the required output format & print all the copies you need. **Price only £9.00.**

DUMPY 3 Fast becoming the de facto standard screendump program, producing all the screen dumps you will ever need for your Spectrum! No need to understand assembler; DUMPY's code GENERATOR creates the screendump, relocates it, and saves it ready for use in your programs. Over 1000 different size, shape and density screendumps, anywhere in RAM! Price less than £p per dump!! **£8.50.**

LIN-O-TYPE Add style to your written word, print out any wordprocessor file on tape, microdrive or disk in high density NLQ in a choice of 25 fonts, or turn your Spectrum into a full WYSIWYG electronic typewriter, superb for addressing envelopes, filling in forms or writing short notes. **Price £8.50.**

ASTRUM+ NEW!! The very best Z80 assembler and monitor package for the Spectrum; Exceedingly versatile, powerful and easy to use; Full wordprocessor style editor; Unlimited source code; Assembly using microdrives or the Opus Discovery; Command driven monitor with multiple breakpoints, single stepping, slow run etc. **Price £13.50 (state microdrive or Opus version).**

DISC MANAGER NEWEST!! A brand new utility for users of the Discovery drives; Full disk sector editor and file management program; Erase, rename, copy groups of files; Examine, modify and understand disk directory information; Examine, modify and recover damaged data. **Price £10.50 on 3½" disk only.**

Bradway Software programs drive most (currently 16 different) interfaces; Letta-Head, Dumpy & Lin-O-Type require an Epson compatible printer and are compatible with Microdrive, Wafadrive & Disk. Prices are for cassettes, include full instructions and p&p within Europe; please add £2.00 worldwide airmail postage, £1.50 for microdrive cartridge or disk. Send for further details!

33 CONALAN AVENUE, SHEFFIELD, S17 4PG

TECHNOLOGY SO ADVANCED ...



MEMORY
* 512Kbytes RAM (520ST-M, FM)
* 1024Kbytes RAM (1040ST-F)
* 192Kbytes ROM
* 128Kbytes external plug-in ROM option

ARCHITECTURE
* Motorola 68000 Central Processing Unit (CPU) with a clock speed of 8MHz
* 16-bit external data bus
* 32-bit internal data bus
* 24-bit address bus
* 8×32-bit data & address registers
* 7 levels of interrupts
* 56 instructions
* 14 addressing modes
* 5 data types
* DMA (Direct Memory Access)
* real time clock as standard

GRAPHICS
* full bit-mapped display
* palette of 512 colours

Using Atari Monitors (on 520 & 1040):
* 640×400 high resolution - monochrome
* 640×200 medium resolution - 4 colours
* 320×200 low resolution - 16 colours
* 80 column text display (40 col low res)

Using Domestic TV (on 520):
* 640×200 medium resolution - 4 colours
* 320×200 low resolution - 16 colours
* 40 columns × 25 line text display

SOUND AND MUSIC
* 3 programmable sound channels
* frequency programmable 30Hz - 125KHz
* programmable volume
* wave & dynamic envelope shaping
* programmable attack, decay, sustain, release
* Musical Instrument Digital Interface (MIDI)
* MIDI allows connection of synthesisers etc.

MOUSE
* high precision
* 2 button control
* free with 520ST-FM/1040ST-F
* non slip ball motion sensor
* removable ball for easy cleaning

STANDARD SOFTWARE
* GEM desktop + TOS operating system
* ST BASIC interpreter/language system

INPUT/OUTPUT
* MIDI out .... (5 pin DIN) 31.25K baud
* MIDI in .... (5 pin DIN) 31.25K baud
* audio out .. 1.0V DC peak to peak, 10K ohm
* audio in .... 1.0V DC peak to peak, 10K ohm
* RGB monitor .... 1.0V DC, 75 ohm
* mono monitor .... 1.0V DC, 75 ohm
* mono horizontal scan rate 35.7KHz
* mono vertical scan rate 71.2KHz
* sync .... 5V DC (active low) 3.3K ohm
* modem/serial .... RS232C, 50 to 19,200 baud
* floppy disk .... 250 Kbits/s
* hard disk .... 11.3 Mbits/s
* mouse .... standard Atari connector
* joystick .... standard Atari connector
* cartridge port .... 128K capacity
* RF output (520ST-FM) .... for TV use

OPERATING SYSTEM
* TOS with GEM environment in ROM
* hierarchical file structure with sub-directories and path names
* user interface via GEM, with self explanatory command functions
* multiple windows + icons
* window resizing, re-positioning and erasing
* drop down menus (selected by mouse)
* GEM virtual device interface

COMMUNICATIONS
* RS-232C serial modem port
* 8-bit parallel printer port
* MIDI port (also for networking use)
* VT52 terminal emulation

KEYBOARD
* standard QWERTY typewriter format
* 95 full stroke keys
* 10 function keys
* 18 key numeric keypad + cursor keys
* variable auto-repeat & key click response
* keyboard processor reduces CPU overhead

... IT'S AFFORDABLE

ONLY FROM SILICA

Finally, there's a personal computer that not only solves problems like other computers, but also solves the one problem that other computers have created. Affordability. Silica Shop are pleased to present the ST range of personal/business computers from Atari. The ST was designed utilizing the most recent breakthroughs in semiconductor technology, producing a personal computer that performs tasks with fewer parts. Which means it costs less to make. And less to buy. The latest ST computers now include built in power supplies and built in disk drives. The TOS operating system and GEM window environment are now on ROM chips which are already installed in the ST keyboard. This enables automatic instant booting when you switch on. Silica Shop are pleased to offer the complete Atari ST range. Our mail order department is situated in Sidcup and we have 4 retail outlets at Sidcup, Orpington, Lion House (Tottenham Court Rd) and Selfridges (Oxford Street). We have eight years experience of Atari products, longer than any other UK company, and are well established as the UK's No.1 Atari specialist. With a group turnover of over £5 million and in excess of 70 staff, we provide unbeatable service and support. We provide several facilities which you will find invaluable during your Atari computing life and most of these facilities are available **ONLY FROM SILICA**. We suggest that you read through what we have to offer, before you decide where to purchase your Atari ST.

FREE STARTER KIT - Only From Silica

When you purchase any Atari ST keyboard, you will not only receive the best value for money computer on the market, but you will also receive the following from Atari Corporation as part of the package:

** BASIC Language Disk * BASIC Manual * ST Owners Manual * TOS/GEM on ROM*

If you buy your ST from Silica Shop, you will also receive:

** NEOchrome - colour graphics program * 1st Word - Word Processor*

In addition, we at Silica would like to see you get off to a flying start with your new computer, so we have put together a special **ST STARTER KIT** worth over £100, which we are giving away **FREE OF CHARGE** with every ST computer purchased at our normal retail prices. This kit is available **ONLY FROM SILICA** and is aimed at providing users with a valuable introduction to the world of computing. We are continually upgrading the ST Starter Kit, which contains public domain and other licensed software, as well as books, magazines and accessories all relevant to ST computing. Return the coupon below for full details.

DEDICATED SERVICING - Only From Silica

At Silica Shop, we have a dedicated service department of five full time Atari trained technical staff. This team is totally dedicated to servicing Atari computer products. Their accumulated knowledge, skill and experience makes them second to none in their field. You can be sure that any work carried out by them is of the highest standard. A standard of servicing which we believe you will find **ONLY FROM SILICA**. In addition to providing full servicing facilities for Atari ST computers (both in and out of warranty), our team is also able to offer memory and modulator upgrades to ST computers.

1Mb RAM UPGRADE: Our upgrade on the standard Atari 520ST-M or 520ST-FM keyboard will increase the memory from 512K to a massive 1024K. It has a full 1 year warranty and is available from Silica at an additional retail price of only £86.96 (+VAT = £100).

TV MODULATOR UPGRADE: Silica can upgrade the 1040ST-F to include a TV modulator so that you can then use it with your TV set. This is an internal upgrade and does not involve any untidy external boxes. A cable to connect your ST to any domestic TV is included in the price of the upgrade which is only £49 (inc VAT). The upgrade is also available for early 520ST computers at the same price.

THE FULL STOCK RANGE - Only From Silica

We aim to keep stocks of all Atari related products and our warehouse carries a stock of £½ million. We import many software titles direct from the USA and you will find that we have new releases in advance of many of our competitors. Unlike dealers who may only stock selected titles, we have the full range. In addition, we carry a complete line of all books which have been written about the Atari ST. A range as wide as ours is something you will find is available **ONLY FROM SILICA**.

AFTER SALES SUPPORT - Only From Silica

Rest assured that when you buy your ST from Silica Shop, you will be fully supported. Our free mailings give news of releases and developments. This will help to keep you fully up to date with what's happening in the Atari market. And in addition, our sales staff are at the end of a telephone line to service all of your Atari requirements. If you purchase an ST from Silica and would like any programming or technical advice, we have a full time technical support team to help you get the best from your computer. Because we have both the staff and the systems specifically dedicated to providing after sales service on Atari ST computers, we are confident that our users enjoy an exceptionally high level of support. This can be received **ONLY FROM SILICA**.

FREE CATALOGUES - Only From Silica

At Silica Shop, we recognise that serious users require an in-depth information service, which is why we mail free newsletters and price lists to our ST owners. These are up to 48 pages long and are crammed with technical details as well as special offers and product descriptions. If you have already purchased an ST and would like to have your name added to our mailing list, please complete the coupon & return it to us. The information service is available **ONLY FROM SILICA**.

FREE OVERNIGHT DELIVERY - From Silica

Most orders are processed through our computer within 24 hours of receiving them. Most hardware orders are sent by the overnight METRO courier service FREE OF CHARGE to customers within the UK. This method helps to ensure minimum delay and maximum protection.

PRICE MATCH - Only From Silica

We hope that the combination of our low prices, FREE UK delivery service, FREE Starter Kit and FREE after sales support, will be enough to make you buy your Atari equipment from Silica Shop. If however, there is something you wish to purchase, and you find one of our competitors offering it at a lower price, then please contact our sales department, providing us with our competitor's name, address and telephone number. If our competitor has the goods in stock, we will normally match the offer (on a 'same product - same price' basis) and still provide you with our normal free delivery. We realise that we are not the only company who will match a competitor's price. However, if you come to us for a price match, you will also be entitled to our after sales service, including free newsletters and technical support. This makes our price match promise rather special, something you will receive **ONLY FROM SILICA**. We don't want you to go anywhere else for your Atari products. So shop at Silica, the UK's No1 Atari Specialist.

SIDCUP (& Mail Order) **01-309 1111**
1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX

LONDON **01-580 4839**
Lion House (1st floor), 227 Tottenham Court Rd, London, W1

LONDON .... **01-629 1234 ext 3677**
Selfridges (1st floor), Oxford Street, London, W1A 1AB

520ST-M

The affordability of Atari computers is reflected in the price of the 520ST-M keyboard, which is a mere £259 (inc VAT). This version of the ST comes with 512K RAM, as well as a modulator and lead for direct connection to any domestic TV. The price does not include a mouse. In addition, when you buy your 520ST-M from Silica, you will also receive the FREE Silica 'ST Starter Kit'. During 1987, many software houses will be producing games software on ROM cartridges, which will plug directly into the cartridge slot on the 520ST-M keyboard, giving instant loading without the expense of purchasing a disk drive. With the enormous power of the ST, you can expect some excellent titles to be produced, making this the ultimate games machine! If your requirement is for a terminal, then the 520ST-M can fulfill this role too. Leads are available to connect the ST to a variety of monitors, and with the imminent introduction of terminal software on ROM cartridge, the ST provides a low price terminal for business use. If you wish to take advantage of the massive range of disk software available for the ST range, you will need to purchase a disk drive. Atari have two floppy disk drives available, a ½ Mbyte model £149 and a 1Mbyte model £199. Full details of these drives, as well as the Atari 20Mbyte hard disk are available on request. If required at a later date, the mouse may be purchased separately.

£259

520ST-FM

The 520ST-FM with 512K RAM and free mouse, represents a further breakthrough by Atari Corporation in the world of high power, low cost personal computing. This model is the latest addition to the ST family, and is not only powerful, but compact. It is priced at only £399 (inc VAT) a level which brings it within the reach of a whole new generation of computer enthusiasts. When purchased from us, it comes with the FREE Silica 'ST Starter Kit' see paragraph on the left. To make the 520ST-FM ready for use straight away, Atari have built into the keyboard a ½ megabyte disk drive for information storage and retrieval, allowing you easy access to the massive range of disk based software which is available for the ST. This new computer comes with all the correct cables and connections you will need to plug it straight into any standard domestic television set. You do not therefore have to purchase an Atari monitor. If you do require a monitor however, these are available with the 520ST in the following money saving packages:

520ST-FM Keyboard	*Without Monitor*	- **£399** (inc VAT)
520ST-FM Keyboard	*+ High res mono monitor*	- **£499** (inc VAT)
520ST-FM Keyboard	*+ Low res colour monitor*	- **£599** (inc VAT)
520ST-FM Keyboard	*+ Med res colour monitor*	- **£699** (inc VAT)

Because the 520ST-FM has its own power transformer built into the keyboard, there are no messy external adaptors to clutter up your desk space. You are left with only one mains lead, serving both the disk drive and the computer. You couldn't ask for a more stylish and compact unit.

£399

1040ST-F

For the businessman and the more serious home user, Atari have their most powerful model, the 1040ST-F with 1028K RAM. This low cost powerhouse can be introduced into a business environment as a stand-alone system, or can support a mainframe computer as a terminal. The 1040ST-F not only features twice as much memory as the 520ST-FM, but also includes a more powerful built-in disk drive. The drive featured on the 1040ST-F is a one megabyte double sided model. The extra memory facility of the 1040ST-F makes it ideal for applications such as large databases or spreadsheets. Like the 520ST-FM, the 1040ST-F has a mains transformer built into the console to give a compact and stylish unit with only one mains lead. The 1040ST-F is also supplied from Silica Shop with a free software package and 'ST STARTER KIT'. In the USA, the 1040ST-F has been sold with a TV modulator like the 520ST-FM. However, for the UK market, Atari are manufacturing the 1040ST-F solely with business use in mind and it does not currently include an RF modulator, this means that you cannot use it with a domestic TV (Silica Shop do offer a modulator upgrade for only £49). The 1040ST-F keyboard costs only £599 (inc VAT) and, unless a modulator upgrade is fitted, will require an Atari or third party monitor. There are three Atari monitors available and the prices for the 1040 with these monitors are as follows:

1040ST-F Keyboard	*Without Monitor*	- **£599** (inc VAT)
1040ST-F Keyboard	*+ High res mono monitor*	- **£699** (inc VAT)
1040ST-F Keyboard	*+ Low res col monitor*	- **£799** (inc VAT)
1040ST-F Keyboard	*+ Med res col monitor*	- **£899** (inc VAT)

The 1040ST-F comes with a mouse controller and includes 1Mbyte of RAM. It has a 1Mbyte double sided disk drive and mains transformer, both built into the keyboard to give a compact and stylish unit, with only one mains lead.

£599

ATARI ST

To: Silica Shop Ltd, Dept YC 0687, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX

PLEASE SEND ME FREE LITERATURE ON THE ATARI ST

Mr/Mrs/Ms: .... Initials: .... Surname: ....

Address: ....

....

....

.... Postcode: ....

Do you already own a computer
If so, which one do you own? ....

BARBARIAN

The Ultimate Warrior



THE ULTIMATE WARRIOR THE ULTIMATE GAME



SPECTRUM VERSION

AVAILABLE FOR:
COMMODORE 64
48k SPECTRUM
AMSTRAD CPC



AMSTRAD VERSION

Available from all good computer game stockists, or by mail order from: **Palace Software, 275 Pentonville Road, London N1 9NL.**

PALACE SOFTWARE

Send cheque or postal order for £9.99 (Cassette), or £12.99 (Commodore or Amstrad Disk) plus 80p P&P. Access and Barclaycard holders telephone 01-278 0751.